

The University of Chicago

THE DOVER-NEW PHILADELPHIA,
OHIO, AREA

A DISSERTATION SUBMITTED TO THE
FACULTY OF THE DIVISION OF THE
PHYSICAL SCIENCES IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF GEOGRAPHY
1941

By
JAMES REED BECK

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James R. Beck
Kent, Ohio

August 6, 1941

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENT	11
LIST OF TABLES	1v
LIST OF ILLUSTRATIONS	vi
Chapter	
I. THE AREA AND ITS MAJOR GEOGRAPHIC PROBLEMS . .	1
Section 1. Delimitation, Size, and Popu- lation	1
Section 2. Location	2
Section 3. Pattern	4
Section 4. Functions	6
Section 5. Depressed Condition	9
II. THE FUNCTIONAL PATTERN OF THE AREA	11
Section 1. The Development of the Major Pattern Lineaments	11
Stages in Urban Occupance	11
The Stage of the Pioneer Village, 1804- 1825	11
The Stage of the Three Canal Villages, 1825-1854	13
The Stage of Early Industrialism, 1854- 1881	16
The Stage of Expanding Metallurgical Activity, 1881-1929	19
The Stage of Declining Metallurgical Activity, 1929-1940	24
Section 2. Secondary Features of the Pattern	25
The Central Districts of Dover and New Philadelphia	25
The Residential Districts	32
Extensive Manufactural Use Districts	38
Extensive Recreational Land Use Districts.	44
The Pattern of Street Usage	44
III. THE FUNCTIONS OF THE AREA	46
Section 1. Regional Manufactural Functions .	46
Characteristics of Individual Units	57
The Regional Manufactural Prospect	65
Section 2. Sub-regional and Local Functions.	68
Sub-regional and Local Manufacturing . . .	68
Retail and Allied Services	72
Jobbing Functions	82
Governmental and Social Functions	83
The Sub-regional and Local Service Prospect	85
IV. CONCLUSIONS	93
APPENDIX	98
BIBLIOGRAPHY	101

LIST OF TABLES

Table	Page
1. General Occupational Analysis of Dover-New Philadelphia and Messillon, Ohio	7
2. Population Growth in the Dover-New Philadelphia Area	15
3. Radial Roads and Consequent Streets	23
4. Absolute and Relative Extents of Urban Districts	27
5. Distribution of Regional Manufactural Employment by Districts	41
6. Sources of Principal Raw Materials Used in Regional Manufactural Plants	48
7. Selected Items in Production Cost in Regional Manufactural Establishments	50
8. Native White Population in Per Cent of Total	51
9. Lowest Priced "Run of Mine" Coal Delivered at Selected Cities in Ohio, 1936	52
10. Analysis of Tuscarawas County Coal	52
11. Tax Levy-City Purposes (School Levy not Included) for 1938 in Selected Ohio Cities	53
12. Principal Markets of Regional Manufactural Establishments	55
13. Sub-regional and Local Manufactural Establishments	69
14. Distance to Limits of Sub-regional and Local Manufactural Service Areas in Miles	72
15. Distance to Limits of Retail and Allied Serviential Service Areas in Miles	73
16. The Dover-New Philadelphia Share of Tuscarawas County's Stores and Retail Sales	75
17. The Proportion of the Total Sales of Selected Establishments Which Is Drawn from the Various Trade Zones	78
18. Estimated Division of Retail Trade at Dover-New Philadelphia by Residents and by Other Purchasers	78
19. Estimated Total Per Capita Trade at Dover-New Philadelphia with Residents of the Trading Zones	79
20. Estimated Per Capita Purchases in Dover-New Philadelphia by Residents of the Trading Zones .	80
21. Number of Average Customers in Intermediate and Outer Zones Required to Equal One Average Customer in the Inner Zone	80

LIST OF TABLES - Continued

Table		Page
22.	Relative and Absolute Coal Production of Tuscarawas County, 1883-1938	90
23.	Mechanization of Coal Mines in Ohio and Tuscarawas County, 1938	91
24.	Size of Coal Mines in Ohio and Tuscarawas County, 1938	92

LIST OF ILLUSTRATIONS

(All illustrations are in the pocket attached to the back cover)

Figure

1. Extent, Dover-New Philadelphia Area, 1939.
2. Regional Situation, Dover-New Philadelphia Area.
3. Local Situation, Dover-New Philadelphia Area.
4. Land Utilization, Dover-New Philadelphia Area Ohio, 1939.
5. Site, Dover-New Philadelphia.
6. Sequential Fixation of Pattern, Dover-New Philadelphia Area.
7. Urban Districts, Dover-New Philadelphia Area, 1939.
8. Dover Commercial Core Utilization of Ground Floor.
9. Dover Commercial Core Utilization of Upper Floors.
10. New Philadelphia Commercial Core Utilization of Ground Floor.
11. New Philadelphia Commercial Core Utilization of Upper Floors.
12. Selected Service Areas of Local and Sub-regional Manufacturing Establishments of the Dover-New Philadelphia Area.
13. Villages, Towns, and Cities In or Near the Dover-New Philadelphia Trade Territory.
14. Selected Service Areas of Retail and Serviential Units of the Dover-New Philadelphia Area.
15. Trading Zones and Trading Areas Served by Dover-New Philadelphia.
16. Service Areas of Wholesale Establishments of the Dover-New Philadelphia Area.
17. Coal Mines of Tuscarawas County.

Plate

- I. Landscapes of the Area and Its Umland.
- II. Part of New Philadelphia From the Air Looking Northward.
- III. Part of Dover Looking Downward from 10,000 Feet.
- IV. Views in the Central Shopping Districts.
- V. Residences.
- VI. Manufacturing Landscapes.

CHAPTER I

THE AREA AND ITS MAJOR GEOGRAPHIC PROBLEMS

Section 1. Delimitation, Size, and Population

The Dover-New Philadelphia Area is a term used to designate an urban unit developed by the gradual and partially incomplete merging of two formerly separate functional units. The area includes the incorporated cities of Dover and New Philadelphia, Ohio, together with contiguous and non-contiguous sections that are functional parts of the unit, though not within the municipal limits of either city (Fig. 1). The Functional unit comprises 6.00 square miles in Dover and New Philadelphia, 3.63 square miles adjoining them which are characterized by nearly continuous and dominant urban and peri-urban occupancy, and several peri-urban outliers with an aggregate extent of 0.31 square miles. In 1929 the population of the incorporated portion was 22,081;¹ in 1936 it was 24,314.² In 1936 the population of the urbanized sections beyond the municipal limits was 884.³ The total population of the area in 1936 was 25,198. In 1940 the population of the incorporated portion was 22,019.⁴ In 1936 the average density of population of the 6.00 incorporated square miles was 4,052 per square mile and that of the total area of 9.94 square miles was 2,535 per square mile, densities far below the 10,000 per square mile which is considered by Jefferson to mark the lower limit of city population densities.⁵ Nevertheless, the population

¹Compiled from census data.

²Compiled from data in Walsh's 1937 New Philadelphia, Dover, and Strasburg, Ohio, Directory (Binghamton: Walsh Directory Company, 1937). These data are probably less reliable than ones from the census.

³Field data.

⁴Compiled from census data.

⁵Mark Jefferson, "Great Cities of 1930 in the United States with a Comparison to New York and London," The Geographical Review, XXIII (1933), 91. "The writer's own conception of city densities begins at 10,000 to the square mile."

and types of land use within the area are almost entirely urban.¹

Section 2. Location

The area lies approximately seventy miles south of Cleveland and seventy-five miles west of Pittsburgh (Fig. 2).² It is the western portion of the Pittsburgh-Cleveland region of the American manufactural belt;³ in the Middle Kittanning coal field in the northwestern border of the Northern Appalachian coal field;⁴ and in the northern section of the unglaciated, maturely dissected Allegheny Plateau.⁵

The area has a focal position in the surrounding locality (Fig. 3). To the northeast and the southwest of the area lie broad zones in which the smoothed outlines of tumbled hills rise approximately two to three hundred feet above the bottoms of rounded valleys (Fig. 3 and Plate Ia). These hills in most places are considerable obstacles to communication, travel, and transportation, but in some places within the hill zones, smooth floored valleys with slight gradients offer easy natural routes. The Upper Tuscarawas,⁶ the Beaverdam, the Brandywine, Crooked Creek,

¹The area has only two families engaged in farming and two small farms.

²According to maps by the Corps of Engineers U.S. Army, Potential Water Power (Washington: Engineer Reproduction Plant, U.S. Army, 1935), Sheets 2 and 3, it is 72 miles from the mouth of the Cuyahoga River in Cleveland to New Philadelphia and 77 miles from the confluence of the Allegheny and Monongahela Rivers in Pittsburgh to New Philadelphia.

³Richard Hartshorne, "A New Map of the Manufactural Belt of North America," Economic Geography, XII (1936), 50-51.

⁴J.A. Bownocker and Ethel S. Dean, Analysis of the Coals of Ohio, Geographical Survey of Ohio, Fourth Series Bulletin 34 (Springfield: Kelley-Springfield Publishing Company, 1929), Map 2.

United States Geographical Survey, World Atlas of Commercial Geology (Washington: United States Geological Survey, 1921), Plate 8.

⁵J.A. Bownocker, Geological Map of Ohio, Geological Survey of Ohio (Baltimore: A. Hoen and Company), 1920.

⁶The terms Upper Tuscarawas and Lower Tuscarawas are used to distinguish respectively the portions of the river lying above and below the confluence of the Tuscarawas River and Sugar Creek.

and Oldtown valleys are such natural routes converging upon the area.

Between the hill zones most of the Dover-New Philadelphia Area occupies part of a nearly level valley floor which varies from a half-mile to nearly two miles in width (Fig. 3). The valley, much deeper in pre-glacial time than now, was partially filled with glacial outwash. The valley train was subsequently cut into a series of flattish terraces and bottoms.¹ North of the area this valley is drained by Sugar Creek and south of it by the Tuscarawas River. The Sugar Creek-Tuscarawas Valley² affords the easiest natural route across this section of the Allegheny Plateau.

A nearly continuous line of urban occupancy extends along the Sugar Creek-Tuscarawas Valley from the northern outskirt of Strasburg thirteen miles to the valley of Stillwater Creek, a tributary of the Tuscarawas, and into it three miles to the southern limits of Uhrichsville and Dennison. This linear urban development roughly parallels the major highway and railroads in the valley. It is composed in part of "stringtown," with homes, stores, and clay plants, and in part of the city, town, and village clusters of Strasburg, Parral, Dover, New Philadelphia, Midvale, Uhrichsville, and Dennison (Fig. 3). The total population of these cities, towns, and villages is 35,224 and comprises 51.6 per cent of the 68,193 inhabitants of Tuscarawas County.³ In the Dover-New Philadelphia Area a large portion of the population is supported by work in scattered clay plants (Plate Id). The Dover-New Philadelphia Area contains the major population agglomeration of the linear urban development and its midpoint.

¹Frank Leverett, Glacial Formations and Drainage Features of the Erie and Ohio Basins (Washington: United States Geological Survey, 1902), p. 158 and pp. 402-403.

Ohio State Geological Survey, Geological Survey of Ohio, III (Columbus: Nevins and Myers, 1878), 52-53.

²The term Sugar Creek-Tuscarawas Valley is used to designate this major valley and distinguish it from the valleys drained by single streams.

³U.S. Bureau of the Census, Fifteenth Census of the United States: 1930. Population Bulletin, First Series, Ohio, Number and Distribution of Inhabitants (Washington: Government Printing Office, 1933), p. 29. Strasburg, 1,305; Parral, 205; Dover, 9,716; New Philadelphia, 12,365; Midvale, 667; Uhrichsville, 6,437; and Dennison, 4,529.

Thus located near the junctions of converging natural routes from the hill zones with those of the Sugar Creek-Tuscarawas Valley and in the center of the nearly continuous line of urban occupancy, which contains over half of the population of Tuscarawas County, the Dover-New Philadelphia Area has the most highly focal situation of the locality (Fig. 3). It is a small capital, serving a little umland¹ from which routes are drawn across the grain of the topographic structure, as well as along the valleys.

Section 3. Pattern

The Dover-New Philadelphia Area has a distinctive pattern (Figs. 1 and 4). It extends along the Sugar Creek-Tuscarawas Valley nearly seven miles, but has a general width of less than two miles. It lies mainly upon the flattish surfaces of three upper terraces and the bottoms of the Sugar Creek-Tuscarawas Valley (Fig. 5). The area is composed of six major parts (Fig. 1). In four of them the landscapes are preponderantly urban. In each of these a partial autonomy of pattern has been developed in adjustment to separations from the others. The city of Dover is divided into Northern Dover and Southern Dover by the Tuscarawas River. The city of New Philadelphia is similarly severed into Northern New Philadelphia and Lockport by the river. The two cities are partially detached from one another by an extensive tract of non-urbanized land that is surrounded by strips of built-up city adjoining Southern Dover and Northern New Philadelphia. Most of the streets in each of the four major sections of more intensive land use are oriented independently of those in the other parts (Fig. 4). There are relatively few connecting streets between these parts. Northern Dover and Southern Dover are linked by two street bridges. Northern Dover and Southern Dover are connected with Northern New Philadelphia by two arterial highways and a slightly used through street. Lockport is joined to Northern New Philadelphia by only one bridge. The routes from Northern Dover to Lockport cross both Southern Dover and Northern New Philadelphia. The slightly urbanized land separating Southern Dover from Northern New Philadelphia and the peri-urban lands which form an interrupted fringe around the four urbanized portions are the

¹The term umland is used to designate immediately contiguous territory served by an urban center.

other major parts of the area.

Within each of the predominantly urbanized portions of the area, Northern Dover, Southern Dover, Northern New Philadelphia, and Lockport, there is functional diversity in land use. The area has two fully developed and largely independent commercial cores, one in Northern Dover and the other in Northern New Philadelphia. In the commercial cores, closely grouped buildings, mostly one, two, and three stories in height, are used mainly by retail, serviential, and financial establishments, but in part by establishments performing manufactural, wholesale, storage, communal, and residential functions (Plates II and III). The commercial districts are bordered by transition zones of diversified usage and these are surrounded by residential districts and manufactural tracts. The residential districts are occupied chiefly by lawns surrounding single homes arranged along tree-shaded streets, but contain scattered lands used for other purposes (Fig. 4 and Plates II and III). In the manufactural tracts large and small factories occupy scattered pieces of land for the most part surrounded by larger unused land surfaces (Fig. 4 and Plates Id, Ic, and III).

The area is crossed by the Ohio Canal. Railroads traverse the area and converge within it. Arterial highways follow indirect courses through the area and other highways converge upon either the commercial core of Dover or that of New Philadelphia. The area has a railroad hub and two highway foci.

Six major geographic problems arise out of the distinctive land use pattern in the Dover-New Philadelphia Area. The fact that centrifugal and centripetal forces have been operating about several inner or nuclear zones, rather than the normal single one,¹ is suggested by the presence within the small and generally flat-tish area of two municipalities. It is indicated by the division of the more fully urbanized land into four partially distinct parts in which the street patterns are not aligned or well integrated with one another. It is emphasized by the existence of three transportation foci within the area. The presence of several nuclear zones leads to the following problems:

¹Charles C. Colby, "Centrifugal and Centripetal Forces in Urban Geography," Annals of the Association of American Geographers, XXIII (1933), 1-20.

(1) To discover why several nuclear zones have been developed.

(2) To discover the manner in which the lesser details of land use have been adjusted to the presence of several nuclei.

(3) To discover the manner in which the social organization of the inhabitants has been adjusted to the presence of several nuclei.

(4) To discover the extent and manner in which the regional functions of the area are affected by the presence of the two commercial cores.

(5) To discover whether or not the several nuclei are permanent features of the land use pattern.

(6) To discover what rearrangements in the land use pattern, if any, are desirable or feasible.

Section 4. Functions

Manufactural, retail, wholesale, financial, serviential, communal, and governmental functions for the region are performed by establishments of the Dover-New Philadelphia Area. The size and generic character of these services are to a considerable degree typical of cities of the same general size which are included within the overlapping sections of the Pittsburgh-Cleveland Region of the American manufacturing belt, the Northern Appalachian Coal Field, and the non-glaciated Allegheny Plateau. Manufacturing is the most important function supporting the people of the area (Table 1). The industrial raw materials are to a major extent secured within the Pittsburgh-Cleveland region (Fig. 2). The fuel used is, in the main, produced in the Middle Kittanning coal field. The laboring force has been drawn largely from the region of agricultural poverty lying in the dissected non-glaciated Allegheny Plateau.¹ The wages have been below those in the larger cities of the Pittsburgh-Cleveland region, there have been few strikes, and there has not been much union activity.² The largest part of the manufactural workers is engaged in the production of

¹W.H. Haas, "Influence of Glaciation in Ohio," Bulletin of the Philadelphia Geographical Society, XV (1917), 19-42.

²These significant advantages are attributed by the manufactural leaders of the area to the character of the population.

TABLE 1

GENERAL OCCUPATIONAL ANALYSIS OF DOVER-
NEW PHILADELPHIA AND MASSILLON, OHIO^a

	Dover-New Philadelphia		Massillon ^b	
	Number of Workers	Per Cent of Population (25,198)	Number of Workers	Per Cent of Population (26,400)
Manufacturing	2,871 ^c	11.39	5,266	19.95
Trade	1,365 ^d	5.42	1,383	5.24
Professional Services	637 ^e	2.53	719	2.72
Public Service	207 ^f	.82	155	.59
Total for these four Occupations	5,070	20.16	7,523	28.50
Total for all Occupations	....	....	10,574	40.05

^aOccupational Groups used by the Bureau of Census for occupational statistics.

^bBureau of the Census: Fifteenth Census of the United States: 1930. Occupational Statistics, Ohio (Washington: U. S. Government Printing Office, 1932), pp. 28-30.

^cData from manufactural executives.

^dBureau of the Census: Fifteenth Census of the United States: 1930. Retail Distribution, Ohio (Washington: U. S. Government Printing Office, 1932), p. 38 and Bureau of the Census: Fifteenth Census of the United States: 1930, Wholesale Trade, Ohio (Washington: U. S. Government Printing Office, 1932), p. 42.

^eData based upon Welsh's 1937 New Philadelphia, Dover, and Strasburg, Ohio, Directory, the telephone directory, and field inquiry.

^fInformation supplied by public officials.

metallic consumer goods marketed widely throughout the United States, but with the major market within the densely populated American manufactural belt. However, the Pittsburgh-Cleveland region and the nearby Detroit region have been important markets for partly finished goods and the Pittsburgh-Cleveland region has been an important market for mine and factory equipment and for consumer goods. Each of the eighteen regional manufactural

establishments possesses distinct individuality. Nevertheless, they are alike in securing most of their raw materials outside of the locality.

The retail, wholesale, financial, serviential, communal and governmental functions of the area are closely associated with its location. Some of the establishments of the larger cities of the Pittsburgh-Cleveland region compete vigorously with those of Dover and New Philadelphia to perform these functions. This competition greatly affects the size of the service areas of Dover-New Philadelphia establishments and the character of the services they render within them. The population groupings in the locality near the coal mines and clay plants form nuclear centers attracting people who might, in their absence, use the services provided in the Dover-New Philadelphia Area. However, these population groupings add so many inhabitants to the vicinity of Dover-New Philadelphia that they may increase the service demands in the area more than they reduce them.

The services to the farming population of the northeastern hill zone, the southwestern hill zone, and the Sugar Creek-Tuscarawas Valley vary because of differences in the economy and purchasing power of the inhabitants. In the northeastern hill zone, the cash grain and mixed livestock farming practiced by the inhabitants, mostly of English stock, has been destructive of land resources. As a result a gradual shift toward a subsistence economy is under way and many farms are being abandoned. In the southwestern hill zone the dairying economy of the inhabitants, generally of Swiss or south German stock, has been less destructive of land resources. The purchasing power of the inhabitants is greater than in the northeastern hill zone. In the Sugar Creek-Tuscarawas Valley the fertile and level alluvial soils have been used for an intensive dairying economy which supports even greater purchasing power.

At present the principal products sold from the farms are sour cream and milk used in cheese plants and a condensery. Before the depression many farmers received materially higher prices from the sale of fresh milk for urban markets than they could obtain by sale to cheese plants or the condensery.¹ If the fluctu-

¹C.G. McBride, "The Development of Market Milk Areas in Northeastern Ohio," The Ohio Agricultural Experiment Station Bulletin 469 (1930), pp. 1-43. C.G. McBride and T.K. Cowden,

ating boundary of the urban milk territory again includes the locality, the purchasing power of the farmers is likely to be increased. If more land in the locality is retired from agricultural use, either through continued abandonment or through reforestation to prevent erosion and the consequent silting of reservoirs of the Muskingum Watershed Conservancy District, the demand for services will be reduced.

The calls upon the services of the Dover-New Philadelphia Area also fluctuate markedly because so many people of the locality are supported by coal mining and heavy clay manufacturing, which have marked variations in employment, consequent upon changes in industrial demand.

The county-seat functions of Tuscarawas County are performed chiefly in New Philadelphia, but some of them are rendered in Dover. Bases of important services of the state and national governments are also located in the area.

Three major geographical problems grow out of the functional character of the Dover-New Philadelphia Area. These are:

(1) To discover the reasons for the localization of the manufactural establishments within the area and to discover the conditions which enable them to function successfully within it.

(2) To discover the extent of the service areas of retail, wholesale, financial, serviential, communal, and governmental establishments of the Dover-New Philadelphia Area; to discover differences in the services rendered by these establishments within parts of their service areas; and to discover the reasons for the development of these characteristics in a region of strong competition between closely spaced cities of various sizes.

(3) To discover the significance to the inhabitants of the Dover-New Philadelphia Area of the differential characteristics of portions of the service areas and of changes occurring within them.

Section 5. Depressed Condition

The Dover-New Philadelphia Area, in common with most of the United States, is passing through a period of severe economic

"Sources of Market Milk and Butterfat in Ohio," The Ohio Agricultural Experiment Station Bulletin 523 (1933), pp. 1-38.

stress, but these conditions in the Dover-New Philadelphia Area may be due in part to conditions which do not originate in the general depression. In 1927, before the general depression, a blast furnace, coke ovens, and a large iron foundry were removed from the area. Between 1929 and 1936 the ratio of workers in the Dover-New Philadelphia regional manufactural establishments declined from 16.9 per hundred inhabitants to 10.4 per hundred inhabitants.¹ This decrease in manufactural employment was largely caused by the closing and sale of two steel mills and the failure of two small factories. These four establishments in 1929 employed 46.5 per cent of the workers in the regional manufacturing industries. These facts may indicate that the area is experiencing a long range decline caused by changing conditions which are no longer favorable for large-scale heavy manufacturing. However, the appearance of new industries and the considerable expansion of an older one during the depression period since 1929 indicate that the present unemployment may be a temporary feature of a transition in the character of manufactural functions which is unlikely to be of long range duration.

Uncertainty as to the fundamental character of the depressed condition and its probable duration raises three major geographical problems:

- (1) To determine the nature of the forces producing the loss of manufactural employment.
- (2) To determine the assets and liabilities of the area for attracting new sources of employment or enlarging old ones.
- (3) To discover, on the basis of these findings, the procedures which are most likely to afford the best solution of the unemployment crisis.

The solution of the problems growing out of the individual pattern, functions, and depressed condition of the Dover-New Philadelphia Area are of primarily local significance. However, they also have broader geographic significance, because similar problems grow out of similar conditions in many areas.

¹Computed on the assumption that between 1929 and 1936 the increase in population in the portion of the area outside the municipal limits was the same as that within the municipal limits.

CHAPTER II

THE FUNCTIONAL PATTERN OF THE AREA

Section 1. The Development of the Major Pattern Lineaments

Stages in Urban Occupance

The distinctive pattern of the Dover-New Philadelphia Area is largely a heritage. There have been five stages in the urban occupance of the area:

- (1) The stage of the pioneer village, 1804-1825.
- (2) The stage of the three canal villages, 1825-1854.
- (3) The stage of early industrialism, 1854-1881.
- (4) The stage of expanding metallurgical activity, 1881-1929.
- (5) The stage of declining metallurgical activity, 1929-1940.

Each stage has contributed distinctive features to the pattern. Successive stages were initiated by changes in functional relationships of sufficient magnitude to shift the most active urban development from one part of the area to another. The cultural patterns left by each preceding stage were a patrimony to its successor from which some features have been preserved by geographic inertia. Distinctive residual features of this kind are the two municipalities, two commercial cores, the distinctive street pattern, several transportation foci, the long and narrow shape of the area, and its six main parts: Northern Dover, Southern Dover, Northern New Philadelphia, Lockport, the undeveloped portion between New Philadelphia and Dover, and the peri-urban fringe.

The stage of the pioneer village, 1804-1825.--The nucleus around which Northern New Philadelphia developed was localized in adjustment to conditions during the period from 1804-1825. The pioneer village of New Philadelphia was established at the terminus of an overland route from western Pennsylvania to detached settlements in the Sugar Creek-Tuscarawas Valley. Before the Revolutionary War the activities of missionaries to the Indians

familiarized many of the people of western Pennsylvania with the flattish, well-drained terrace lands in the Sugar Creek-Tuscarawas Valley.¹ After the war these lands received settlers somewhat earlier than most of the rugged lands of the intervening sections of the Allegheny Plateau.² A principal overland route to these settlements reached the Sugar Creek-Tuscarawas Valley by following, in its western part, the valley of Beaverdam Creek (Figs. 3 and 5).³ The situation near the entrance of the minor Beaverdam Valley into the major Sugar Creek-Tuscarawas Valley was focal during the pioneer period. From it, routes diverged to scattered settlements in the locality. The village of New Philadelphia was laid out in 1804 on a broad, flat, flood-free upper terrace to the northwest of the point where the Beaverdam enters the Sugar Creek-Tuscarawas Valley (Figs. 5 and 6).⁴ This site was preferable to the one at the junction of the valleys since the latter was at times flooded by water from Beaverdam Creek, which has a lessened gradient within the major valley. It was also more desirable than the site to the southeast of the junction where the upper terrace was less extensive and was crossed by Beaverdam Creek (Fig. 5).

New Philadelphia quickly acquired nodal traits. It became the western terminus of the overland road to and from the East and the point of departure on the riverine route to New Orleans.⁵ In 1806 New Philadelphia was selected as the county seat of Tuscarawas County, a new governmental unit created to serve conveniently the people of the detached, remote settlement.⁶ The first county building, a combined jail and court house, was erected in 1808 northeast of the square, on the lot which contains the present court house (Fig. 4).⁷ Local routes, which converged upon the entire Dover-New Philadelphia Area, were attracted to the village. Within the village, these routes met in the square. Nearby sites were conveniently located for performing services needed in the frontier community. By 1821 the village had two

¹The History of Tuscarawas County, Ohio (Chicago: Warner, Beers, and Company, 1884), pp. 264-322.

²*Ibid.*, p. 330.

³*Ibid.*, p. 468.

⁴*Ibid.*, p. 473.

⁵*Ibid.*, pp. 337 and 469.

⁶*Ibid.*, pp. 353-355.

⁷*Ibid.*, pp. 359-360.

stores selling general merchandise and buying produce of the vicinity, several taverns, a fur trader, a druggist, two doctors, a lawyer, two tailors, a shoe maker, a tanner, a potter, a gunsmith, several carpenters and cabinet makers, a wheelwright, a book binder, and a newspaper.¹ By the close of the pioneer stage, the grouping of establishments near the square in Northern New Philadelphia had formed a commercial core with service facilities exceeding those of other villages in the Sugar Creek-Tuscarawas Valley. The village had a rectangular street pattern oriented with respect to the outer margin of the terrace site.

If the village of Northern New Philadelphia and the commercial core had not attained nodal traits before the construction of the Ohio Canal, it is unlikely that a major part of the area would have developed in this place. After the building of the canal, the transportational pattern of the area was so modified that Northern New Philadelphia no longer occupied the most focal situation. Its continued growth was, for some time, largely based upon geographic inertia. Its commercial establishments drew much of their trade from people attracted to the county seat for public transactions.

The stage of the three canal villages, 1825-1854.--The nuclei of Northern Dover and Lockport were established in the period between 1825 and 1854. The construction of the Ohio Canal inaugurated the stage of the three canal villages. Settlement in the vicinity was greatly accelerated.² Workers brought to Ohio to build the canal became residents. Immigrants entered the county with less difficulty by way of the Erie Canal, Lake Erie, and the Ohio Canal than they would have encountered by using the old overland route across Pennsylvania and Ohio. The costs of goods brought to the district fell considerably and the prices of farm produce rose materially, increasing the desirability of dwelling in the locality.³ Commercial grain farming replaced the predominantly subsistence economy previously practiced. By 1850 or 1860 settlers had taken up most of the unoccupied agricultural

¹Ibid., pp. 468-470.

²C. C. Huntington and C. P. McClelland, The History of the Ohio Canals, the Ohio State Archaeological and Historical Society (Columbus: Press of Fred J. Heer, 1905), pp. 120-121 and 127-132.

³The History of Tuscarawas County, Ohio, op. cit., p. 388.

lands of Tuscarawas County and agricultural occupancy was essentially completed.¹

The increased purchasing power and the enlarged rural population in the hinterland stimulated the growth of village population. Between 1820 and 1840² it increased from 282 to 1,318, or 367 per cent (Table 2). The altered trade relations made situations beside the canal commercially advantageous. Sixty-one per cent of the increase in village population was on the right bank of the Tuscarawas, near the canal, and only thirty-nine per cent in the established village of New Philadelphia on the left bank. Northern Dover had been laid out in 1806 on the Dover Upper Terrace with its streets either parallel or at right angles to the riverward terrace margins (Figs. 5 and 6). The village is believed to have had only ten houses in 1824.³ After the construction of the canal, Northern Dover was more favorably situated than Northern New Philadelphia and grew more rapidly. Grain and other farm products were shipped over the canal from Dover to market. Goods from the East were received at Dover for local distribution. By 1840 the population of Dover exceeded that of New Philadelphia (Table 2). Although population statistics are unavailable for Dover in 1850, Dover's more rapid increase probably continued to the close of the canal-villages stage in 1854.

The commercial core of Dover was located near the margin of the upper terrace overlooking the canal and near the first bridge crossing the Tuscarawas (Fig. 6).⁴ Commercial and manufacturing establishments serving the locality were localized in the Dover Commercial Core to such an extent that it became the principal trading center of the vicinity.⁵ Local routes which

¹In all the farm townships of Tuscarawas County the population has declined since either 1850 or 1860. In the townships with important coal mines, clay plants, villages, towns, or cities the subsequent increases have not been due to agricultural settlement.

²The population of Dover in 1850 is unknown.

³The History of Tuscarawas County, Ohio, op. cit., pp. 534-535.

⁴The bridge was erected in 1820.

⁵The History of Tuscarawas County, Ohio, op. cit., p. 535.

TABLE 2
POPULATION GROWTH IN THE DOVER-NEW PHILADELPHIA AREA^a

Year	New Philadelphia	Lockport	Dover
1820	236	....	46
1830	410	....	....
1840	531	189	598
1850	1,413	178	....
1860	2,360	....	1,343
1870	3,143	250	1,593
1880	3,070	....	2,208
1890	4,456	....	3,470
1900	6,213	449 ^b	5,422
1910	8,542	575 ^b	6,621
1920	10,718	697 ^b	8,101
1930	12,365	767 ^b	9,716
1940	12,328	....	9,691

^aCompiled from census data.

^bThe part of New Philadelphia that was formerly Lockport.

focused upon the entire Dover-New Philadelphia Area were extended to provide convenient access to the newly dominant trading center, as they had previously been drawn to the commercial core in Northern New Philadelphia.

By 1829 the competition of Northern Dover had affected business in Northern New Philadelphia to such an extent that a village, known as Lockport, was established on the Lockport Upper Terrace beside the canal, south of the river and Lock Thirteen, and opposite New Philadelphia (Figs. 5 and 6).¹ Lockport and New Philadelphia were joined at first by a ferry and later by a bridge. The streets in Lockport were oriented with respect to the riverward margin of the upper terrace and the two crossing points. Commercial and manufactural establishments of Lockport were grouped near the junction of roads focusing upon the crossings.² Residences were erected nearby to provide housing con-

¹Ibid., p. 498.

²Ibid., p. 498.

veniently accessible to employment in Lockport and on the canal. The development of Lockport in this situation was an indirect outgrowth of the sequential development of Northern New Philadelphia and Northern Dover. The chief advantage of Lockport's situation beside the canal was its proximity to the established county-seat village of Northern New Philadelphia. It was developed in conjunction with New Philadelphia to compete with the more favorably located village of Northern Dover.

By the end of the stage in 1854, the Dover-New Philadelphia Area contained three villages with independently oriented streets (Fig. 6). Each village had a small nucleus in which were grouped commercial, manufactural, and communal establishments. The three villages had become fixed items of the cultural pattern to which subsequent developments were adjusted. The significance of the canal in the development of the pattern of the Dover-New Philadelphia Area does not conform to the general tendency in Ohio.¹

The stage of early industrialism, 1854-1881.--In the period from 1854 to 1881 population growth (Table 2), based increasingly upon diversified manufacturing, led to continued urban expansion of the established villages of Northern Dover, Lockport, and especially Northern New Philadelphia (Fig. 6). Before 1854 the three villages of the Dover-New Philadelphia Area were dominantly service centers for a restricted local umland. The foundations for the development of a community largely supported by regional manufacturing were established in the stage of early industrialism from 1854 to 1881. A shift in the prevailing mode of transportation and the localization of the first heavy metallurgical establishment ushered in the transition. Incipient in 1851, there was a long range decline in the receipts of the Ohio Canal.² This decline resulted largely from competition with newly built railroads.³ By 1858 expenditures on the Ohio Canal exceeded revenues from it.⁴ In three years the state legislature was willing to lease the canals to private individuals.⁵ After fourteen years

¹ Alfred J. Wright, "Ohio Town Patterns," The Geographical Review, XXVII (1937), 621. "The influence of the canal on Ohio town forms therefore seems to have been slight."

² C.C. Huntington and C.P. McClelland, op. cit., p. 170.

³ Ibid., p. 43.

⁴ Ibid., pp. 168-171.

⁵ Ibid., p. 47.

these individuals voluntarily surrendered their lease of the canal system of the state by refusing to pay the semi-annual rent of \$10,037.50.¹ Although the state resumed control of and still owns most of the canal lands of the Dover-New Philadelphia Area, the canal was allowed to depreciate and to become unnavigable.

In 1854 a railroad branch from Bayard, on a main railroad line joining Cleveland and Pittsburgh, was completed to New Philadelphia and Dover. It was financed partly with local capital to secure advantageous railroad contacts.² Both Northern Dover and Northern New Philadelphia desired a terminus and each received one. The branch from Bayard entered the area by the valley of the Upper Tuscarawas and divided upon the lower terrace opposite Northern Dover (Figs. 3 and 5). One arm crossed the river to a terminus near the commercial core on the margin of the Dover Upper Terrace. The other traversed an unurbanized portion of the New Philadelphia terrace to a terminus within two blocks of the square in Northern New Philadelphia. From this point the line was subsequently extended to serve coal mines in Beaverdam Valley.

The second railroad was a part of a line completed in 1872 from Wheeling to Cleveland.³ It followed the major Sugar Creek-Tuscarawas Valley in traversing the area and approached both Dover and Northern New Philadelphia to provide stations conveniently near the commercial cores (Figs. 3 and 6). The third railroad was completed in 1874 from Marietta to Dover where it joined the branch to Bayard.⁴ It followed a direct route from Newsomerstown to Dover across the hilly country within a big bend of the Tuscarawas River by utilizing the valley of Buckhorn Creek and that of Stone Creek as approaches to a low divide (Fig. 3). This line was subsequently extended by a northern branch to the clay plants at Parral.

The railroad lines of the area meet near the confluence of Sugar Creek with the Tuscarawas River. The eccentric position

¹Ibid., p. 48.

²The History of Tuscarawas County, Ohio, op. cit., pp. 393-396.

³Ibid., pp. 396-397.

⁴Ibid., p. 397.

of the railroad focus within the urbanized sections is atypical. The locations of Northern New Philadelphia and of Lockport at considerable distances from the railroad hub are vestiges of occupation preceding the development of the railroad pattern.

After 1854 railroad transportation began supplanting traffic on the canal. By this change the right bank of the Tuscarawas River lost the monopolistic advantage of direct contact with the principal transportation facility, although the canal continued in use for heavy transportation throughout the stage of early industrialism. The centripetal attraction of the Northern New Philadelphia Commercial Core became ascendant, partly because it contained the county courthouse in addition to other service facilities. After 1870 the growth of New Philadelphia was stimulated by the development of coal mines in the Pike Run Valley and the Beaverdam Valley.¹ Some miners resided in New Philadelphia and most of them used its various facilities. Between 1840 and 1870² the town population of the area increased from 1,318 to 5,278, or 401 per cent (Table 2). Seventy-one per cent of this increase was concentrated in Northern New Philadelphia and only twenty-nine per cent in Northern Dover and in Lockport. The declining use of the canal and the proximity of the larger commercial core in Northern New Philadelphia probably led to the disappearance of the smaller one in Lockport toward the close of the stage.³

A blast furnace using local ore, limestone, and fuel was erected in either 1854 or 1855⁴ in Northern Dover on the lower terrace bordered by the Tuscarawas River and Sugar Creek. A rolling mill was built on the opposite side of the river in 1866.⁵

¹Ibid., p. 498.

²Since population data are lacking for Dover in 1850 and Lockport was included with New Philadelphia in 1880, these years cannot be used in computing the shifting center of population growth during the early manufacturing stage. The full magnitude of the shift from the right to the left bank of the Tuscarawas is thus hidden.

³Four typical retail forms in Lockport, probably erected during the canal villages stage, are no longer used commercially. A resident who recalls vividly the last few years of canal operation does not remember retail stores occupying them.

⁴History of Tuscarawas County, Ohio, op. cit., p. 543.

⁵Ibid., p. 544.

Sometime before 1875, a puddling mill was constructed near the furnace.¹ These factories were significant in the rapid increase in heavy metallurgy and population in the succeeding stage of occupation. In the early manufactural stage, Dover also had two flour mills, a fire brick plant, a furniture factory, a boiler works, and a planing mill.² Northern New Philadelphia possessed three flour mills, a factory manufacturing agricultural machinery, a tannery, two planing mills, a foundry, two carriage shops, and a woolen mill which employed more workers than any other establishment of the area.³ There were two paper mills, a brewery, a flour mill, and a lime kiln in Lockport.⁴ The manufactural establishments of the Dover-New Philadelphia Area either fabricated local raw materials or supplied limited local markets.

At the close of the stage of early industrialism in 1881, Northern Dover and Northern New Philadelphia had grown from villages into towns. Lockport had also grown, but its functions had been integrated with those of Northern New Philadelphia. Each of the three centers of urban occupation had a compact form. They had predominantly rectangular street patterns, oriented in each to the riverward margins of their respective terrace sites. The main features of the railroad pattern were established. Diversified manufacturing had become an important function of the area and the basis for a rapid expansion in metallurgy had been established.

The stage of expanding metallurgical activity, 1881-1929.--
In the period from 1881 to 1929 population growth (Table 2), largely induced by increased metallurgical activity, led to extensive urban expansion (Fig. 6). Between 1880 and 1930 the population of the area increased from 5,278 to 22,181, or 421 per cent.

Throughout the stage of expanding metallurgy, the number of people trading in the Dover Commercial Core and the number shopping in the New Philadelphia Commercial Core were sufficiently

¹Combination Atlas Map of Tuscarawas County, Ohio (Philadelphia: L.H. Everts and Company, 1875), p. 43.

²History of Tuscarawas County, Ohio, op. cit., pp. 543-545.

³Ibid., pp. 488-493.

⁴Combination Atlas Map of Tuscarawas County, Ohio, op. cit., p. 71.

alike to maintain similar facilities. Neither core offered sufficiently superior services to reduce the other to a subordinate role. Lockport became increasingly unified with Northern New Philadelphia and in 1899 became a part of the New Philadelphia municipality.¹

Although the development of metallurgy within the Dover-New Philadelphia Area was primarily related to the general conditions favoring industrialization in the Pittsburgh-Cleveland Region of the American Manufactural Belt, the presence of the established blast furnace and rolling mill were of significance in attracting industries. A change in ownership of the blast furnace and the rolling mill in 1881 led to increased employment and inaugurated the stage of expanding metallurgy. Financial operations starting with ownership of the blast furnace and the rolling mill resulted in the enlargement of the mill in 1881² and the erection of three other steel mills in 1882,³ 1890,⁴ and 1917.⁵ In 1893 a foundry making sad irons migrated to Dover from Wisconsin.⁶ It was attracted by the local supply of pig iron and a convenient location for marketing. A foundry making moulds, used in casting "pigs" by a continuous chain process, was localized near the Dover blast furnace in 1910.⁷ Molten pig iron was taken directly from the blast furnace to the casting room and poured without reheating. Coke ovens were erected close to the blast furnace to produce the needed fuel. A refinery was built nearby to utilize the tar produced in them. An enameling plant was built in 1903.⁸

¹Information by Arthur H. Williams, Mayor of New Philadelphia.

²Edwin S. Rhodes, The First Centennial Atlas of Tuscarawas County, Ohio (New Philadelphia: Tuscarawas Centennial Association, 1908), p. 139.

³Ibid., p. 190.

⁴Ibid., p. 190.

⁵Albert N. Dennis, Tuscarawas County Information Book (New Philadelphia: The Daily Times, 1927), p. 30.

⁶Ibid., p. 26-30.

⁷Edwin S. Rhodes, op. cit., p. 139.

⁸The company had been formerly located in Belmont, Ohio. Free land and buildings were given to induce the migration. An association of business and industrial leaders, directed by the principal owner of the blast furnace and a steel mill, purchased a tract of land, subdivided it, and raised the necessary funds to purchase the grounds and erect the building by the sale of lots.

The localization of new industries, increasing employment in these establishments, and the development of minor manufactural activities stimulated and sustained a steady growth of population and extensive urban expansion throughout the stage of expanding metallurgy (Table 2 and Fig. 6). As the parts of the area enlarged, they began to coalesce. The area was also acquiring functional unity. Manufactural establishments performed the dominant function of the area and supported the largest group of its inhabitants. Workers in the manufactural establishments dwelt in all of the major parts of the area. The area was no longer comprised of three towns; it became a functional unit.

The convenience of residence near places of work tended to pull housing developments toward concentrations of manufactural employment (Figs. 5 and 6). These were especially significant in four parts of the area, namely:

- (1) the part of the lower terrace between the Ohio Canal and Sugar Creek, where the blast furnace, the coke ovens, the tar refinery, and the mould foundry constituted an important industrial grouping;
- (2) the part of the lower terrace across the Tuscarawas River, where three steel mills and the sad iron foundry formed a manufactural district employing many workers;¹
- (3) the site of the steel mill on the lower terrace in Northern New Philadelphia; and
- (4) the site of the enameling plant on the upper terrace in the northwestern periphery of New Philadelphia.

Each of these four parts of the area combined the advantages of railroad contact and low-priced peripheral locations. The part adjoining the Ohio Canal was occupied first because of its advantages in assembling the bulky raw materials used in the coke ovens and blast furnace. The three parts on the lower terraces had accessible water in the gravel valley filling and from the river. Abundant land, not desired for residential usage, and the nearness of the river facilitated waste disposal.²

¹At present 1,905 of the 2,611 regional manufactural workers in the Dover-New Philadelphia Area are employed in this district.

²Department of Agriculture, Division of Conservation, Map of Ohio Showing Principal Streams and Tributaries (Columbus: 1938). This map shows stream pollution from the northernmost steel mill southward along the Tuscarawas for approximately ten miles. Sugar Creek is polluted for five miles above its confluence with the Tuscarawas. Mine waters, liquids from industrial plants, and the untreated sewage of Dover and New Philadelphia pour into the streams.

The grouping of manufactural establishments near the railroads converging upon the railroad hub on the Dover lower terrace created an ensemble of forces drawing developments toward it and was a significant factor in the coalescence of the previously separate parts of the area.

The convenience of residence near either the Dover Commercial core or that of New Philadelphia exerted so much centripetal force that successive residential developments tended to be grouped concentrically around them. However, irregularities were induced by the general preference for the flood-free upper terrace sites¹ and by the established radial country roads, which provided convenient axes for expansion. Twelve antecedent roads were followed by spreading urban occupancy, (Table 3 and Fig. 6). Secondary streets were generally oriented at right angles to or parallel to these roads. The increased distance between the radiating roads and the relative slowness of lateral development among them have resulted in irregular urban margins. An interrupted lobular periphery with discrete street orientations surrounds the regular, rectilinear street patterns of the older portions of Northern Dover and Northern New Philadelphia (Figs. 4 and 6).

In Southern Dover a confused street pattern resulted from expansion along the two roads leading toward Northern New Philadelphia. The pattern was interrupted by large tracts of land preempted by prior manufactural and communal occupancy (Fig. 6). Between Southern Dover and Northern New Philadelphia a large piece of non-urbanized land is surrounded by urban utilization along the highways joining the sections. Part of this land is unincorporated.²

¹Official Plan for the Muskingum Watershed Conservancy District, Vol. 1, Adopted by Board of Directors, Oct. 8, 1934, Amended April 15, 1935, and Revised June 5, 1935, Table 5 shows flood stages in 1898, 1907, 1908, 1910, and 1913 of 16.1, 12.0, 10.2, 11.5, and 16.1 feet respectively. The gauge was located near the upper bridge on the Tuscarawas River in Dover. C.C. Chambers, Engineer of the District, estimates that each of these floods would have covered the greater part of the lower terraces.

²Although the landscapes of this land are not urban and part of it is farmed, the fact that it is owned by dealers in urban real estate who purchased it with the expectation of eventual profits from sub-division and sale led to its inclusion as a part of the Dover-New Philadelphia Area.

TABLE 3

RADIAL ROADS AND CONSEQUENT STREETS

Country Road	Consequent Street
Northern Dover	
Massillon Road	Wooster Avenue
Zoar Road	Front Street
Canton Road	East Avenue
Sugar Creek Road*	Slingluff Avenue
Southern Dover and Northern New Philadelphia	
Dover-New Philadelphia Inner Terrace Margin Road	Iron Avenue-Boulevard Fourth Street
Dover-New Philadelphia Riverward Terrace Margin Road	Tuscarawas Avenue
Northern New Philadelphia	
Hill Branch to Canton Road	North Broadway
Carrollton Road	Beaver Avenue
Uhrichsville Road	East High Avenue
Stone Creek Road	West High Avenue
Lockport	
Oldtown Valley Road	South Broadway
Goshen Road	Commercial Avenue

*This road goes to the town of Sugar Creek and does not follow the Sugar Creek Valley.

Automobile transportation, especially after 1920, increased the size of the territory having convenient access to the commercial cores and the centers of employment. Peri-urban developments began to appear beyond the urban margins (Fig. 4).

In the stage of expanding metallurgy, rapidly and steadily increasing population had induced fast-spreading urban occupation. The area contained two municipalities, two coordinate commercial cores, two road foci, a railroad hub, and the six major parts of the area--Northern Dover, Southern Dover, Northern New Philadelphia, Lockport, the undeveloped lands between Southern Dover and Northern New Philadelphia, and the peri-urban fringe.

In 1927, toward the end of the stage of expanding metal-

lurgy, three important industries disappeared from the area, but the losses were offset by increased employment in other establishments. The "pig mould" foundry was purchased to eliminate competition. Although part of the building was used as a bronze foundry, fewer workers were employed and the loss of the major local outlet for pig iron led to the abandonment of the blast furnace and the coke ovens. The furnace had originally used local materials, but had gradually shifted to higher grade supplies from distant sources. Since it was unfavorably situated for assembling these materials and had lost its chief market, the furnace could no longer be operated profitably. The furnace and the coke ovens were dismantled.

The stage of declining metallurgical activity, 1929-1940.--
Declining metallurgical activity appeared in the Dover-New Philadelphia Area in 1929 with the closing of two great steel mills. They had fabricated ingots obtained from the Youngstown Area. The plants were old and not fully modernized. They were among the first closed by the American Sheet and Tin Plate Company when the widespread depression curtailed the demand for rolled sheets. The mills have been sold, the machinery has been removed, and the buildings have been idle for many years. A small vacuum cleaner factory and an establishment making cheap shirts failed during the depression. There is no immediate prospect that either the steel mills or the small factories will be reopened. Together, these establishments employed 1,798 workers. Their loss precipitated a major unemployment crisis.

The municipal boundaries of Dover and New Philadelphia have not been extended during the depression period. There has been little building in the four major urban sections--Northern Dover, Southern Dover, Northern New Philadelphia, and Lockport (Fig. 6). Migration into the Dover-New Philadelphia Area virtually closed with the decline in private employment beginning in 1929. Although the population has increased because births exceeded deaths, economic conditions have retarded the establishment of new households. Widespread fear, especially among the financial leaders, that the local depression would outlast the national one has induced great caution in developing real estate.¹

¹Two real estate operators estimate that in 1940 the type of houses used by the low income manufactural workers were selling for from one-third to one-half the current cost of construction.

Most of the new developments have been localized in the peri-urban fringe. Reduced incomes of some families formerly residing in the urbanized sections have been an uprooting factor in them. Rents and dwelling values have not generally fallen as rapidly as the declining incomes. Cheaper land, lower rates of taxation, fewer building restrictions, and sufficient space to permit the production of part of the family's food have been attractive features in the peri-urban zone.¹

Section 2. Secondary Features of the Pattern

The numerous districts included within the six major parts of the area are secondary features of its pattern. The built-up portions of the four major urban parts of the area--Northern Dover, Southern Dover, Northern New Philadelphia, and Lockport--are composed of seventy districts (Fig. 7). These together with the peripheral unoccupied districts included within the municipal limits of Dover or New Philadelphia (Fig. 7), the extensive unincorporated and undeveloped district between the cities (Fig. 4), and thirty-four non-contiguous or differentiated districts of the peri-urban fringe (Fig. 4) comprise a mosaic-like pattern. Each district has a characteristic landscape resulting from a relatively homogeneous association of functions, building forms, and intensity of land use. They are arranged upon the framework of the major pattern lineaments in a logical manner, adjusted to the landforms of the site, the patrimony of cultural patterns left by preceding stages of occupance, and a continuous interplay of internal and external forces within the districts.

The Central Districts of Dover and of New Philadelphia

The central districts of Dover and New Philadelphia, which together occupy .1339 square miles of surface (Table 4), are commercial and social foci which help to preserve two communities within a geographical unit in which common regional functions support the inhabitants. Each central district contains a convenient association of functions, serving primarily a part of the urban area and secondarily a portion of the Dover-New Philadelphia umland. The localization of the individual

¹Reasons given by the owners for building in the peri-urban zone.

functions in the central districts has been based upon anticipated benefits of sufficient magnitude to justify the use of the highest priced land of the area. The central districts are nuclei of the strongest centripetal and centrifugal forces affecting the pattern of the entire Dover-New Philadelphia Area.

The structure and setting of the two central districts are similar. Each central district includes three types of non-residential forms: (1) one, two, and three-story store buildings, designed for an intensive utilization of space, which occupy most of the central part of the commercial core and constitute its central shopping district; (2) other commercial, manufactural, and storage buildings, intended for a less intensive utilization of space, that comprise the remainder of the commercial core; and (3) scattered governmental and communal buildings (Figs. 8, 9, 10, and 11). These three types of forms dominate the inner portions of the central districts, but are mingled with residential forms on their margins.

The arrangement of functions and forms within the two central districts is quite dissimilar. The Dover Central Shopping District has a shape like the capital letter L. Other parts of the central district are scattered near it. The configuration of the New Philadelphia Central Shopping District resembles a + sign. The remaining portions of the central district are clustered around it.

In the Dover Central District, store building occupancy extends along Factory Street from near Front Street, on the edge of the upper terrace, to beyond Third Street (Plate IVa and Fig. 8). It stretches along Third Street from beyond Factory Street to Wooster Avenue (Plate IVb). A few store buildings are scattered along Second Street and Wooster Avenue. The general L shape of the shopping district has resulted from the migration of its most active parts, induced by the obsolescence of buildings and changing foci of attraction.

The shopping district developed, between 1825 and 1854, near the bridge across the Tuscarawas River at the end of Factory Street and the loading basin on the Ohio Canal (Fig. 6). The most active establishments were near Front Street and smaller ones farther along Factory Street. As Dover increased in size and commercial importance, the buildings erected to serve earlier needs became inadequate. New ones were constructed to the west

TABLE 4

ABSOLUTE AND RELATIVE EXTENTS OF URBAN DISTRICTS^a
(FOR LOCATIONS OF DISTRICTS, CONSULT FIGURE 7)

Dis- tricts		Central Districts	Extensive Use Chiefly Manufactural	Very Poor Residential
1-18 ^b	Absolute Area	.0664	.1895	.0032
	Per Cent of Districts 1-18	4.80	13.71	.23
	Per Cent of All Districts	1.48	4.24	.07
19-32 ^b	Absolute Area	....	.4046	.0607
	Per Cent of Districts 19-32	....	55.87	8.38
	Per Cent of All Districts	....	9.04	1.36
33-66 ^b	Absolute Area	.0675	.2513	.0363
	Per Cent of Districts 33-66	3.05	11.40	1.64
	Per Cent of All Districts	1.51	5.62	.81
67-70 ^b	Absolute Area	....	.0212	....
	Per Cent of Districts 67-70	....	13.73	....
	Per Cent of All Districts	....	.47	....
Total	Absolute Area	.1339	.8666	.1002
	Per Cent of All Districts	2.99	19.37	2.24

^aAbsolute areas in square miles obtained by planimeter readings from Figure 7.

^bDistricts 1-18 are mainly in Northern Dover, districts 19-32 are mainly in Southern Dover, districts 33-66 are mainly in Northern New Philadelphia, and districts 67-70 are mainly in Lockport. Urban parts, included within the districts, which lie outside the municipal limits occupy 0.2208 square miles. Non-urban parts within the municipal limits which are not included in the districts occupy 1.5674 square miles. Water surfaces within the municipal limits but outside the districts comprise 0.2208 square miles.

TABLE 4-Continued

Poor Residential	Good Residential	Superior Residential	Extensive Recreational Use	Total
.4778	.4732	.1737	....	1.3838
34.53	34.13	12.60	....	....
10.68	10.57	3.88	....	30.92
.1231	.0804	.0553	....	.7241
17.01	11.10	7.64	....	....
2.75	1.79	1.24	....	16.18
.6936	.8498	.1063	.2075	2.2123
31.35	38.40	4.79	9.37	....
15.51	18.99	2.38	4.64	48.50
.0819	.0513	....	....	.1544
53.04	33.23	....	....	....
1.83	1.14	....	....	3.45
1.3764	1.4547	.3353	.2075	4.4746
30.77	32.49	7.50	4.64	100.0

along Factory Street on land which had not previously been occupied commercially. They were generally larger, some of them having three stories, and were more attractively constructed (Figs. 8 and 9). They offered superior facilities and commanded greater prestige. By 1875 the most active part of the shopping district was on Factory Street near and beyond Second Street.¹

¹Combination Atlas Map of Tuscarawas County, Ohio, op.cit.,

Less pretentious buildings, erected still farther along Factory Street, preempted building sites.

The succession, that involved (1) obsolescence of older, taller buildings, (2) the erection of newer ones on land not previously occupied commercially, and (3) the migration of the most active part of the shopping district, has been repeated. Two other groups of three-story buildings have been erected, one near the intersection of Factory and Third Streets and the other on Third Street near Wooster Avenue. The most active portion of the shopping district was originally on Factory Street near Front Street. It migrated to the intersection of Factory and Second Streets, to the intersection of Factory and Third Streets, and around the corner onto Third Street. The most active part of the shopping district is now located on the western side of Third Street in the first block north of Front Street. Some of the most active establishments are now much farther north, indicating that the migration will continue.

The shift of the axis of expansion from Factory Street to Third Street resulted from the declining importance of the early foci of attraction and the development of new ones. By the time store buildings had been erected along Factory Street to Third Street, the canal basin had ceased to be of significance and another bridge had been erected at the end of Wooster Avenue. The Northward growth of Northern Dover had been so great that Third Street had become the principal approach to the shopping district. Situations on Third Street offered greater functional convenience than ones on Factory Street beyond the Third Street intersection. This induced the shift of the axis of expansion.

The development on the western, landward side of Third Street has been more active than on the opposite side of the street. Store buildings occupy ninety-five per cent of the entire frontage on the western side and only fifty-five per cent of the eastern side. The individual buildings on the western side generally have greater frontage, larger floor space, and are taller than those on the eastern side (Figs. 8 and 9).

The utilization of store building frontage reveals marked

lists more business establishments of 1875 near the intersection of Second Street and Factory Street than near Front and Factory. The book contains pictures of four store buildings. Three of them are near Second Street.

variation in function and in intensity of use (Fig. 8). Financial establishments and drug, jewelry, wearing apparel, hardware, and variety stores are able to utilize superiorly situated building space more effectively than other types of establishments and have, to a major extent, preempted the most active parts of the shopping district. On the south side of Factory Street from the corner west of Third Street to the first alley east of it and on the west side of Third Street from Factory Street to the second alley north of it, financial establishments and the prime intensity retail stores occupy eighty-eight per cent of the ground floor frontage. Fifty-four per cent of all the frontage used by these types of establishments is in this section; thirty-four per cent of it is along other parts of Third Street. Food and furniture stores and serviential establishments occupy most of the other store buildings. The advantages they would derive from situations in the most active part of the shopping district have not been considered sufficient to justify the costs of occupying it. The advantages of adjoining, less costly situations have been deemed desirable.

The buildings of the first two blocks on Factory Street west of Front Street are poorly maintained and are depreciating rapidly, (Plate IVa). The unattractive appearance of this part of the district is a factor in the migration of business establishments and offices to Third Street. Sixteen per cent of the ground frontage on Factory Street between Front and Third Streets is vacant or occupied by residences. Fifty-three per cent of the second floor frontage is vacant. Only seven per cent is used by offices. On the west side of Third Street between Factory Street and Wooster Avenue there are no residences or vacancies on the ground floor, only twelve per cent of the second floor is vacant, and twenty-nine per cent of it is used by offices.

The scattered pattern of commercial buildings other than stores, and of manufactural, storage, governmental, and communal buildings has resulted from their localization near the long L-shaped section of store building occupance. The space requirements for these buildings are so great that they have been excluded from the central shopping section. Desirable situations, near the store buildings, have been in excess of the demands for these uses.

In the New Philadelphia Central District the court house

has been a focus of centripetal attraction in all stages of its development, (Plate IVc). Stores near the court house have been more conveniently located for shopping by persons drawn to New Philadelphia for county business than ones farther away from it. The prestige of establishments has apparently been enhanced by proximity to the court house. Sixty-five per cent of the ground floor frontage used by financial establishments and prime intensity retail stores lies within a half block of the court house, (Fig. 10). Relatively continuous store building occupancy extends approximately one block north, south, east, and west of it. Other commercial forms and manufactural, storage, governmental, and communal buildings tend to be grouped as close as possible to the square on land that has not been preempted by store buildings. The central district of New Philadelphia is, therefore, much more compact than that of Dover.

Although the court house has been continuously a strong nucleus of centripetal attraction, there have been shifts in the focus of greatest shopping activity. South Broadway was developed first, followed in turn by North Broadway, East High Avenue, and West High Avenue. This sequence paralleled the sequence of residential occupancy. The center of population has moved in succession from south of the square to north, east, and west of it, (Fig. 6). The oldest three-story buildings are south of the square. Those to the north, east, and west of it are consecutively newer. Financial and prime intensity retail establishments occupy thirty-two per cent of the ground floor frontage in store buildings south of the square, thirty-seven per cent north of it, and fifty per cent east of it. Although they employ only forty-one per cent of the ground frontage west of it, the northern side of West High Street is continuously occupied by them for the first half block beyond the square. This is now the most active part of the shopping district, (Plate IVd). It contains two chain ten cent stores, localized there on the basis of pedestrian counts. Continued development of West High Street is probable. Second floor vacancies take up seventy per cent of the frontage south of the square, twenty-three per cent north of it, thirty per cent east of it, and thirty-seven per cent west of it. Apparently, the court house exerts a powerful attraction for second floor occupancy. The high per centage of vacancy to the west of the square may be expected to decrease as the prestige of the newest section

increases in conformity to its expanding retailing activity. The New Philadelphia Central District has more offices and more public buildings than the Dover Central District, largely as results of its county seat functions.

The Dover Commercial Core and the New Philadelphia Commercial Core have clung to their first general situation with tenacity. Throughout the development of the area, the populations served most conveniently by the two cores have been approximately equal. The facilities in them have been so nearly alike that neither has been able to offer sufficient shopping advantages to reduce the other to a subordinate role. Under these circumstances, people tend to trade in whichever core is nearer to their places of residence. Unless there is a major shift in the pattern of residential occupancy, the two cores will probably continue to maintain a balanced status in their present location. There is no single part of the entire area which is as accessible to the inhabitants of the area and its upland as the two commercial cores now serving them.

The Residential Districts

Residential occupancy covers a much larger part of the Dover-New Philadelphia Area than all other types of land use. Residential districts cover 73.0 per cent of the urban portion (Fig. 7 and Table 4) and 89.7 per cent of the peri-urban fringe (Fig. 4).¹

The residential forms of the urban portion of the area generally consist of single family, two-story wooden homes. Most of them have cellars, four to eight rooms, central heating, modern plumbing, gas for cooking, and electric lights. The majority of the homes have flowers and shrubbery in lawns fifty by one hundred feet, or larger, in size and lie along broad, shaded streets.²

¹Based upon planimeter readings from Figure 4 and Figure 7.

²The lots in the oldest portion of New Philadelphia are sixty-five by two hundred feet in size and those in the oldest portion of Dover are fifty by two hundred feet in size. Some of the lots have been subdivided in depth. Most of the lots in the newer portions of the area are similar in extent to the ones in the older parts.

The peri-urban fringe is differentiated by the larger size of lots which, in many cases, are used in part for gardens, small orchards, and little chicken yards. Some have small pastures and shelters for a cow or goat. The houses are structurally similar to those in the urban part, but probably have fewer conveniences. However, most of them have electricity and many of them have water systems and bathrooms.

Although similar characteristics of the housing forms and their wide spacing in the urban and peri-urban portions give to the residential pattern a broad unity unlike that of many larger cities,¹ the pattern contains significant differentiating features. These exist in combinations of the following traits:

Size of residence:

- Small: less than 15,000 cubic feet.
- Medium: 15,000 to 25,000 cubic feet.
- Large: over 25,000 cubic feet.

Age of building:

- Old: erected before 1900.
- Moderate: erected 1900 to 1920.
- New: erected since 1920.

Maintenance of building:

- Poor: marked depreciation caused by lack of painting and repairing.
- Fair: some depreciation caused by lack of maintenance.
- Excellent: very slight depreciation caused by inadequate maintenance.

Upkeep of Grounds:

- Poor: lawns neglected or absent.
- Average: lawns regularly mowed; flowers and shrubbery present, but not generally consisting of expensive types.
- Superior: lawns carefully tended; expensive plantings of flowers and shrubs.

Occupance of lots:

- Compact: over 80 per cent of the lots in use.
- Moderately compact: 60 to 80 per cent of the lots in use.
- Scattered: less than 60 per cent of the lots in use.

The size of building, the maintenance of the dwelling, and the upkeep of the grounds are closely correlated. The income of the inhabitants is the chief determinant of these traits which significantly affect residential desirability. Using the following scale of desirability indices--size of buildings (1)

¹The Dover-New Philadelphia Area contains only three apartment buildings.

small, (2) medium, (3) large; maintenance of buildings (1) poor, (2) fair, (3) excellent; and upkeep of grounds (1) poor, (2) average, (3) superior-- , very poor residential districts have as the sum of indices the number three, poor residential districts have sum indices of four or five, good residential districts have sum indices of six or seven, and superior residential districts have sum indices of eight or nine.¹ The four types of districts with varying residential desirability have sharply contrasting appearances (Plate V).

In each sequential stage in the development of the area, the highest income groups were able to obtain the best sites and situations and to develop and maintain upon them districts with the most desirable characteristics. The middle income groups were able to secure less desirable sites and situations and to create and support upon them districts with less desirable characteristics. The lowest income group was able to acquire only the least desirable sites and situations and to produce and sustain upon them districts with the least desirable traits. The residential quality first established in a location has tended strongly to survive. The mosaic-like pattern of the districts of varying residential desirability, therefore, reveals the considerations which originally produced their differentiation.

The inhabitants of the area have consistently shown strong preferences for (1) locations near the central districts and the major places of employment, (2) positions along the principal streets leading to the central districts, (3) upper terrace sites not too near the riverward terrace margins, and (4) for situations adjoining pleasant cultural landscapes and remote from unattractive ones.

The arrangement of the residential districts occupied before 1881 reveals the consistent operation of these preferences in the development of a simple pattern. The superior districts were near the central districts of Dover and New Philadelphia and along the principal streets leading to them. In Northern Dover they lay beside Wooster Avenue and Third Street and in Northern New Philadelphia beside North Broadway, South Broadway, East High Avenue, and West High Avenue (Fig. 6). Parts of the old

¹A sum index of six does not mean that the district has twice the desirability of a district with an index of three, but means that it is more desirable than a district with an index of five.

superior residential districts that adjoin the central districts have retrogressed into the good classification. These deteriorating portions include part of district 14 between the Dover Central District and the superior residential district to the northwest, the parts of district 60 which lie between the New Philadelphia Central District and the superior districts to the north and east, two blocks to the west of the central district along High Street, and all of district 59. In all of these parts, the maintenance of fine old buildings and their grounds is markedly declining. Some of the buildings are being used for non-residential purposes. District 59 is becoming a rooming house district. The central districts are exercising a centrifugal influence upon residents with higher incomes. The superior districts developed before 1881 which have not retrogressed lie farther from the central districts. They include parts of districts 17 and 18 in Northern Dover and parts of districts 64 and 67 in Northern New Philadelphia.

The residential districts that were originally developed as good sections occupy situations surrounding the superior districts and the ones which have retrogressed into the good classification. They are near the central districts and in the inner portion of the upper terraces. They include districts 13 and 14 in Northern Dover, district 60 in Northern New Philadelphia and district 69 in Lockport.

Poor residential districts form a nearly continuous border between the superior and good districts and the riverward terrace margins and a discontinuous border on the landward periphery of the portions developed before 1881. The poor districts of the riverward terrace margin consist of districts 6, 7, 8, and 9 in Northern Dover, district 42 in Northern New Philadelphia, and district 68 in Lockport. The poor districts of the inner periphery comprise all or parts of districts 6 and 9 in Northern Dover, and districts 49, 50, 54, 55, and 58 in Northern New Philadelphia. Their situations were formerly of low desirability because of the distances to the central districts and to the places of employment. They are now more advantageously located than better quality districts lying beyond them. Their status, as poor districts, was largely fixed by the small size of the buildings erected in them. They are relict features of the former peripheral zone.

In the stage of expanding metallurgical activity, the growth of population was so much more rapid than in the stages preceding it that the pattern of residential districts shows a marked break along the boundaries occupied before and after 1881. The preferences affecting the arrangement of districts of varying residential quality, however, remained constant. The superior districts were located along the arterial streets leading to the commercial cores. In Northern Dover districts 17 and 18 developed outward from the portions that had been occupied prior to 1881. In New Philadelphia district 66 was similarly extended and a new one, superior district 65, developed along Fourth Street, the principal highway to Dover. In Southern Dover superior district 32 developed along another portion of this route. Good districts occupied the more accessible situations on the upper terraces, but avoided the riverward terrace margins. These districts include all or parts of districts 14, 15, and 16 in Northern Dover, district 31 in Southern Dover, districts 60, 61, 62, and 63 in Northern New Philadelphia, and districts 69 and 70 in Lockport. Poor districts expanded along the riverward terrace margins and developed on the landward peripheries in portions of lesser accessibility. These include all or parts of districts 9, 10, 11, and 12 in Northern Dover; district 29 in Southern Dover; districts 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 55, 56, and 57 in Northern New Philadelphia; and district 68 in Lockport. Very poor districts 41 in Northern New Philadelphia, and 22 in Southern Dover are similarly located in the landward periphery.

The increasing distance to the manufactural establishments and commercial core in Dover gave to the centripetal forces centered in them sufficient power to overcome the dislike for lower terrace sites. Very poor residential districts 4 and 5 were located in or near the old metallurgical district in Northern Dover. In Southern Dover residential districts were interspersed between the large manufactural plants, the railroads, the fair grounds, and the children's home on the lower terrace. The districts were subject to flood hazard. They were noisy, dirty, and situated among unattractive landscapes. Districts 20 and 21 are of very poor desirability; districts 23, 24, 25, 26, 27, and 28 are of poor desirability; and district 30, the only good residential district upon any of the lower terraces of the Dover-New Philadelphia Area, is anomalously located.

After 1929 in the stage of declining metallurgical activity the peri-urban fringe became the most actively developing residential section. It was so far from the central districts that most of the people attracted to it were from the lower income groups. Poor residences are characteristic, although a few superior ones are clustered on a high hill north of New Philadelphia that overlooks the cities and a few superior and good residences are scattered among the more numerous poor ones in the heterogeneous district to the southeast of New Philadelphia.

The changes in the rate of population growth after 1881 and 1929 resulted in distinct breaks in the urban pattern which have been preserved. Similar characteristics may once have marked the limits of 1825 and 1854, and these may have been obliterated with the passage of time. However, it is more probable that the inauguration of new stages during the slow, steady growth before 1881 did not produce much differentiation in the secondary features of the pattern.

Some scattered pieces of land within the residential districts are used for non-residential purposes. They are so small that they should not be classed as separate districts and, in the main, they serve the inhabitants of one or several districts rather than those of the larger parts of the area. Seven outlying schools perform this function. Nine churches are remote from the central districts. Five of these are in poor or very poor residential districts and apparently serve groups detached in social status, as well as location. Although the presence of the two commercial cores increases the accessibility of the central shopping facilities, the interrupted urban pattern increases the need for neighborhood food stores. There are twenty-five of them in the urban parts and four in the peri-urban fringe. They occur in greatest number in poor residential districts, on the margins of districts of varying quality, and on or near arterial streets (Figs. 4 and 7). Gasoline stations are scattered along the arterial highways. Some automotive sales establishments are located on the arterial highways, especially those joining Dover and New Philadelphia. A truck freight station, the telephone office and exchange, a stove store, a tire shop, a lunch room, and a florist's plant are located beside the Tuscarawas Avenue connection. Two florist shops and three lunch rooms are located along the Boulevard route joining the cities. Five lunch rooms are located along ar-

terial highways in the periphery of the urbanized sections. One is located in an Italian section of Northern Dover, overlooking the lower terrace bordering Sugar Creek. Another is opposite the airport on the Uhrichsville Road. An establishment selling monuments is located near a cemetery. The other small commercial establishments outside the commercial cores are apparently located haphazardly. Four cemeteries, two commercial establishments selling bulky goods, seven repair shops, a bakery, a dairy, the factory making bakelite handles, and four greenhouses are disbursed within the urban residential districts. In the peri-urban fringe there are two cemeteries, the Dover water tower, the New Philadelphia water reservoir, a repair shop of the state highway department, and an airport. All of these extensive uses in the urban and peri-urban parts of the area are now, or were formerly, localized on low-priced peripheral land.

Extensive Manufactural Use Districts

Eight districts of extensive use, which is chiefly manufacturing, occupy 19.37 per cent of the total surface of the seventy urban districts. Idle and active regional and local manufacturing establishments, industrial wastes, commercial establishments dealing in bulky goods, railroads, and tracts of unused land are features commonly occurring in industrial districts. The Dover-New Philadelphia districts also contain some large areas used for public purposes, extensive gravel pits, and parts of the abandoned Ohio Canal. The most distinctive landscapes of the area lie in these eight districts (Plates Ib, Ic, II, and VI). The relatively large portion of the area included in them reveals its industrial character. The regional manufacturing establishments of these districts have employed the workers upon which most of the population growth and the urban expansion of the Dover-New Philadelphia Area has been based since 1854 and they may, therefore, be considered the most important parts of the area.

Nevertheless, these districts are located in situations and on sites which indicate that they have not been the principal foci of centripetal and centrifugal forces affecting the internal pattern of the area. Each of the manufacturing districts is located in contact with Northern Dover, Northern New Philadelphia, or Lockport, the three sections developed in the non-industrial

stages before 1854. Seven of the eight districts are located near the railroads which were laid out to afford contact with Northern Dover and Northern New Philadelphia. Five of them have sites on the lower terraces or their margins which were not desired for residential, general commercial, or communal use. The three upon the upper terrace are now, or were at the time of their occupancy, on the periphery of the built-up area. Each of the eight districts has a consequent location adjusted to the antecedent parts of the cultural pattern.

The old metallurgical district.--The old metallurgical district lies on the margin of the Dover Upper Terrace and on the lower terrace which is bordered by the Tuscarawas River and Sugar Creek (Figs. 4, 5, and 7). It contains the abandoned Ohio Canal, much land used by railroads, a bronze foundry, a tar refinery, a flour mill, a minor unit of a steel mill, industrial ruins, areas covered with industrial wastes, and much unused land (Plate VIa). Its desolate landscapes and relatively unimportant manufactural establishments are partly remnants of an integrated metallurgical district which, at one time, formed the main industrial nucleus of the Dover-New Philadelphia Area. A blast furnace was erected in the district in either 1854 or 1855 and coke ovens, a tar refinery, and a foundry making pig moulds were subsequently built nearby. Iron ore, fuel, and limestone were obtained from the unland over the Ohio Canal and the finished pig iron was sent to market over it. The combination of nearby local iron ore of high quality,¹ the advantages of easy access to the canal and railroads, and the presence of abundant, flat, cheap land for buildings, storage, and waste disposal was probably the principal reason for the localization of the blast furnace in the district. The coke ovens and the tar refinery were erected nearby as subsidiary units. A foundry making "pig" moulds was erected close to the blast furnace so that molten iron could be obtained for casting, thus eliminating the cost of reheating.

The decline of the district was due to external forces and the loss of local markets. After the discovery of the Lake Superior iron ores and the development of the facilities for economically transporting them, the low-grade ores of Tuscarawas County were no longer used. The use of higher-grade Connellsville

¹The iron ore had an average metallic content of twenty-four per cent iron, a high grade at this time.

coal and Lake Erie limestone was found to be more economical. Although the cost of producing pig iron in the Dover-New Philadelphia Area rose above the costs in competitive centers,¹ local factories supplied markets which enabled the blast furnace and coke ovens to continue operation for many years. The local establishments using the pig iron were a foundry manufacturing sad irons which was localized in Dover partly because of the local pig iron supply, a puddling mill that was built to use the pig iron, and a foundry making moulds used in casting "pigs" from molten iron obtained from the blast furnace. Eventually these markets were lost. The demand for cast iron flat irons declined with the development of electrical and gas irons. The puddling mill was transformed into a rolling mill using ingots from the Youngstown Area after the Bessemer process cheapened the making of steel. Finally, the mould foundry was the only important market which sustained the operation of the blast furnace and the coke ovens. In 1929 it was purchased and closed to eliminate competition. The blast furnace and the coke ovens were dismantled, ending fifty-one years of primary iron production in the district. The tar refinery and the bronze foundry, which was placed in Dover to utilize the building obtained through the purchase of the pig mould foundry, are the only active survivals of the Old Metallurgical District.

The minor unit of the steel mill occupies a building on the margin of the commercial core, that was originally used by a defunct wholesale grocery house. The building was purchased at low cost and is now used for light fabrication and storage in conjunction with the operation of the main plant of a steel mill located in Southern Dover.

The original flour mill in the district utilized water power, obtained where a small stream used to feed the canal descended from the upper terrace to the lower one. This mill has been replaced by others erected near the original site.

The district is no longer a major nucleus of centripetal attraction for residential usage, since it is no longer an important center of employment (Table 5). However, it was formerly a district of attraction drawing Northern Dover toward the margin

¹Richard N. Hartshorne, "Locational Factors in the Iron and Steel Industry," Economic Geography, IV (1928), 241-252.

of the Dover Upper Terrace and manufactural occupance to the Southern Dover Industrial District across the river.

The Southern Dover industrial district.--The Southern Dover industrial district is the most important part of the entire Dover-New Philadelphia Area. It contains six of the larger regional manufactural establishments and is the major center of employment (Table 5). It lies partly on a lower terrace and partially on the northern edge of the New Philadelphia Upper Terrace opposite the Old Metallurgical District (Figs. 5 and 7). It is a district of heterogeneous use (Fig. 4). It contains busy streets and railroads, a coal grader and loader at the terminus of a cable car line from a large mine in the northeastern hill zone, two active steel mills, an abandoned steel mill, a factory in which are made electrical and gas appliances and cast flat irons, an animal fats refinery, a hardwood lumber and flooring mill, a plant in which composition wall tile is fabricated, a municipal steam electrical generating station, a city water works, a laundry and dry cleaning establishment, an ice plant, two bulk gasoline stations, a feed and fertilizer store, the county fair grounds, the county children's home, and considerable unused land.

TABLE 5
DISTRIBUTION OF REGIONAL MANUFACTURAL
EMPLOYMENT BY DISTRICTS

District	Number of Workers	Inactive Plants
Old Metallurgical	126	1
Southern Dover Industrial	1,905	1
New Philadelphia Lower Terrace	116	1
New Philadelphia Upper Terrace	370	1
Northwestern Dover	18	..
Lockport	59	..
All Other Districts	17	1

Much of the development of the district grew out of conditions which favored extensive land use within the district about 1881, the beginning of the stage of expanding metallurgy. It contained large areas of non-urban land near the active Old

Metallurgical District, the Dover Central District, the residential districts of Northern Dover, the railroads, and the important roads which joined Northern Dover and Northern New Philadelphia and were parts of the main highways in the Sugar Creek-Tuscarawas Valley. Land values were probably low. The localization of the fair grounds and the children's home in the district is indicative of this, since these establishments are generally placed on cheap land outside built up areas. Industrial water could be obtained from the river or from shallow wells in the gravel filling of the pre-glacial valley. Liquid wastes could be poured into the river and solid ones used for filling low land near the river.

Some of the manufactural establishments of the district were drawn to Dover partly through sequential developments beginning in the Old Metallurgical District. The factory making electrical and gas appliances and cast irons was drawn to Dover partly to be near the blast furnace that supplied the principal raw material for the original product, cast sad irons. The idle steel mill began as a plant puddling iron from the furnace. One of the active steel mills was erected by an individual who purchased the blast furnace and came to Dover to operate it. The other was erected by his son-in-law. The cable car terminus and the coal grader were placed near the steel mills to eliminate the handling of "slack" which is their principal fuel.

The focal position of the district with respect to the street and road pattern was advantageous to the dry cleaning and laundry plant, the bulk gasoline stations, the feed and fertilizer store, and a lumber yard that evolved into the hardwood lumber and flooring mill. The wall board plant is a subsidiary of the planing mill it adjoins. The animal fats refinery occupies a building erected for a non-successful rubber factory. The ice plant uses part of an abandoned brewery. The water pumping station was located centrally in the city of Dover on the gravel valley filling. The municipal electrical generating plant was placed on part of the land acquired for the pumping station.

The New Philadelphia Lower Terrace manufactural district.--

A district of diversified extensive land use is near the Baltimore and Ohio Railroad on the margin of the New Philadelphia Upper Terrace and the adjoining Lower Terrace (Figs. 4 and 7). It contains a garage, a small can factory, a laundry, an ice and

cold storage plant, an idle steel mill, a municipal water pumping station, a factory making coal handling equipment, an electrical transformer and steam heating plant, three junk yards, a used car lot, extensive gravel pits, and much unused land. Low land values are advantageous for all these establishments. Railroad switch connections are, or were, used by the can factory, the ice and cold storage plant, the idle steel mill, the factory making coal loading equipment, the steam heating plant, and two junk yards. Direct accessibility to Northern New Philadelphia facilitates the operations of the garage, laundry, ice plant, slaughter house, the electrical transformer and steam heating plant, the junk yards, and the used car lot. The location of the gravel pits and the pumping station is related to the gravel valley filling. The can factory occupies a building originally used in canning vegetables. The transformer and steam heating plant is located on the power site of the old woolen mill. The idle steel mill formerly used water from wells in the gravel filling and poured its liquid wastes into the Tuscarawas River.

When the steel mill was in operation, the district was the major center of employment in New Philadelphia and the second most important one in the Dover-New Philadelphia Area. It stimulated the growth of all New Philadelphia, but especially the southwestern portion of Northern New Philadelphia. At present the area is no longer an important focus of centripetal attraction (Table 5).

The Northwestern Dover District.--A similar district in Northern Dover lies on the lower terrace and its margins near the Baltimore and Ohio and Pennsylvania railroads (Figs. 4, 5, and 7). It contains a foundry, a machine shop, a vacuum cleaner factory, a steel erection shop, a garage, a lumber yard, an establishment selling farm machinery, a bulk gasoline station, and a cemetery. Cheap land, proximity to Northern Dover, and railroad contacts constitute the district's chief advantages. It is no longer an important center of employment (Table 5). The four factories occupy buildings originally erected for other establishments. At one time, lots were laid out and streets and a park platted in their vicinity; but the factories seem to have exerted little centripetal attraction for residential occupancy.

The New Philadelphia Upper Terrace manufactural districts.--Near the Pennsylvania Railroad in Northern New Philadelphia, there

are three small manufactural districts (Fig. 7). The northern one contains an enamelling plant, an idle vacuum cleaner factory, a lumber yard and cement block plant, and a bulk gasoline station (Fig. 4). The central one has a feed mill, a store selling farm supplies, a lumber yard, and a railroad depot. The southern one has a bulk gasoline station, a small machine shop, a repair shop, and a slaughter house. The northern and southern districts are on the present periphery of the built-up area and the central district was originally located on the margin of the built-up area. Cheap land, the presence of the railroad, and accessible locations in Northern New Philadelphia constituted the chief advantages. With the exception of the enamelling plant, all of the establishments occupy small pieces of land and employ few workers. The localization of the enamelling plant in the Dover-New Philadelphia Area was obtained by offering free land and buildings. Since the needed money was to be raised by selling building lots near the projected factory and since the people had such strong preferences for situations near the central districts and sites upon the upper terraces, the plant was localized upon the nearest upper terrace land to the commercial core which was unurbanized and had railroad connections.

The Lockport manufactural district.--The Lockport manufactural district is the only one of its type without direct railroad connections. It contains a brewery, a dry cleaning plant, a garage, and a slaughter house. The brewery uses a building erected for an early one that depended upon the canal for regional contacts. The other establishments were attracted by cheap land, conveniently near Northern New Philadelphia and Lockport.

Extensive Recreational Land Use Districts

The golf course and two parks are of sufficient size to be considered districts of extensive recreational use (Fig. 7). They lie mainly on low priced, hilly land in the periphery of Northern New Philadelphia. Together they occupy 4.64 per cent of the urban area. The larger park has exerted a decided attraction for good residences.

The Pattern of Street Usage

Northern Dover, Southern Dover, Northern New Philadelphia,

Lockport, and the peri-urban fringe, with their numerous districts, are united into a coordinated whole by the movements of men and goods along the street patterns. The daily migration of workers between their residences and the places in which they are employed is evidence of this unity. They pass between the five main parts of the area, focusing principally upon the Southern Dover Industrial District. Shopping, recreational, and communal activities draw residents from all the residential districts not only to the nearer central district, but also to the remoter one.

In spite of these unifying movements, there is a deep-rooted feeling of communal individuality based mainly upon the preponderant service of one or the other central district. Shoppers, church and fraternal members, teachers and students of the junior and senior high schools, and many other persons move to, from, and within one central district more frequently than the other. In the more residential districts, neighborhood commercial and congregational establishments are foci of lesser movements and even sectional feelings.

The internal street usage has developed five types of arterial streets (1) those connecting Northern Dover, Southern Dover, Northern New Philadelphia, and Lockport; (2) those leading from the residential districts to the Dover Central District and to the New Philadelphia Central District; (3) those within both of the central districts; (4) those leading to the major manufactural establishments; and (5) those leading to the extensive recreational districts (Fig. 4). Many of these arterial street uses follow the same paths. Most of the arterial streets are paved. The other streets are generally paved in the superior and good residential districts and are mainly unpaved in the manufactural districts and in the very poor and poor residential ones.

Some streets of the Dover-New Philadelphia Area are parts of arterial highways which pass through it and others are parts of highways used by traffic between the area and its umland (Fig. 4). The main arterial highway from Cleveland to Marietta follows an indirect route across the city to use paved streets, developed primarily to serve internal needs. Within the city it is joined by through routes leading to Wheeling and to Canton and by local ones connecting the city and its umland. The internal traffic and the external traffic have two major foci, the Dover Central District and the New Philadelphia Central District.

CHAPTER III

THE FUNCTIONS OF THE AREA

Section 1. Regional Manufacturing Functions

Although the percentage of the total population engaged in regional manufacturing decreased from 16.9 in 1929 to 10.4 in 1936 and all types of manufacturing employed only 11.4 per cent of it in 1936, manufacturing remains the principal activity which supports people of the area, and will probably continue to be the dominant factor in the evolution of the area (Table 1).

The industrial activities are mainly regional. Establishments which market essentially all of their products over twenty-five miles from the area employ 2,611 workers, or 90.9 per cent of the total. Sub-regional establishments, which distribute the greater part of their output within twenty-five miles of the area and a minor part within the area, use 29 workers, or only one per cent of the total. Local establishments, which primarily serve the area and perform subsidiary services in the nearby locality, have 231 employees, or 8.1 per cent of the total. The relatively low percentage of the total population engaged in manufacturing and the slight development of employment in local and sub-regional factories are atypical in a manufactural community. Hartshorne states, "In order to eliminate the cities that are essentially non-industrial the writer selected a minimum ratio, 10 per cent as the total population employed as wage earners in manufacturing, as the proportion to be expected in any city, supplying essentially local needs, and not indicating an essentially manufactural character to the city."¹ The low percentage of the total population engaged in manufacturing reflects the retarded development of sub-regional and local establishments which has resulted from competition of industries in nearby larger cities. These have been able to supply many manufactural services more effectively than they could be provided locally.

¹Richard Hartshorne, op. cit., p. 45.

The activities of the regional manufactural establishments are generally adjusted to the advantages and disadvantages of the situation of the area for obtaining raw materials. Each of the eighteen industries obtains the greater part of its raw materials outside the area and its immediate vicinity (Table 6). Twelve of them, employing 89.5 per cent of the workers, fabricate either metallic goods or byproducts associated with metallic manufacturing (Table 6). The principal raw materials for eleven of these, employing 86.0 per cent of the workers, originate in the Pittsburgh-Cleveland region of the American manufactural belt. The area is sufficiently near the great metallurgical centers of the region to secure raw materials from them without heavy transportation costs and is far enough from them to favor the production of goods in which raw materials and transportation charges are not the principal cost items. Raw materials form less than thirty per cent of the value of the finished products in six establishments with 64.9 per cent of the total employees (Table 7). The cost of raw materials is between thirty and sixty per cent of the value of the finished products in ten of them which have 33.4 per cent of the employees. In only two establishments, employing 1.7 per cent of the workers, raw materials costing more than 60 per cent of the final value of the output are used. The position of the area in the central portion of the American manufactural belt is satisfactory for assembling lesser raw materials used in establishments which secure their major supplies in the Pittsburgh-Cleveland region and is not a decisive handicap for the ones which procure them elsewhere (Table 7).

The situation within the Pittsburgh-Cleveland region is advantageous with respect to labor costs. Wage levels have been from twenty to forty per cent below those of larger Ohio industrial centers.¹ This differential has probably resulted partly from the lower cost of living in a smaller community.² To some extent, it reflects the background of the inhabitants. Many persons migrating to the area came from the region of agricultural poverty

¹Based upon hourly wage rates for five types of labor which were given by the chambers of commerce of Akron, Canton, Cleveland, Dover-New Philadelphia, Massillon, Pittsburgh, and Youngstown.

²The homes, household furnishings, clothing, and automobiles of factory workers in the area and in the nearby cities indicate similar living levels.

TABLE 6

SOURCES OF PRINCIPAL RAW MATERIALS USED
IN REGIONAL MANUFACTURAL PLANTS^a

Principal Products	Number of Workers	Per Cent of All Regional Workers	Principal Raw Materials and Their Sources
<u>All Goods Made of Products of Metal- lic Industries of Pittsburgh- Cleveland Region</u>	<u>2,244</u>	<u>86.0</u>	<u>Pittsburgh-Cleveland Region</u>
Diversified wares	1,224	46.9	Steel ingots from Youngstown and plat- ings from Bayonne, New Jersey
Enameled kitchen wares	360	13.8	Steel sheets from Youngstown, sand from Indiana, and imported clay
"Cold Roll" strip steel	293	11.2	Steel ingots from Youngstown
Electrical and gas appliances	201	7.7	Aluminum and fabri- cated parts from Pittsburgh and Cleveland
Coal loaders	88	3.4	Pig iron from Pitts- burgh and Youngstown, coke from Connells- ville, and timber from Dover
Tin cans	28	1.0	Tinned sheets from Wheeling
Vacuum cleanser systems	16	0.6	Fabricated parts from Pittsburgh, Cleveland, and Akron
Refined coal tar	15	0.6	Coal tar from Canton, Massillon, Cleveland, and Youngstown
Oil burners	10	0.4	Iron castings from Pittsburgh-Cleveland Region
Spouting hangers	7	0.3	Wire from Cleveland
Bronze screws	2	0.1	Bronze rods from Pittsburgh

TABLE 6-Continued

Principal Products	Number of Workers	Per Cent of All Regional Workers	Principal Raw Materials and Their Sources
<u>Goods Made From All Other Materials</u>	<u>367</u>	<u>14.0</u>	<u>Metals From Outside Pittsburgh-Cleveland Region and Other Materials From Any Source</u>
Bronze tubes	92	3.5	Bronze from Bayonne, New Jersey
Refined animal fats	77	2.9	Animal fats from Cincinnati, Detroit, Cleveland, Chicago, St. Louis, and Omaha
Beer	59	2.2	Malt from Milwaukee and hops from Oregon and Czechoslovakia
Composition substitute for clay wall tile	58	2.2	Composition wall board from Mississippi and paints from Cleveland
Hardwood interior finishings	52	2.1	Logs from southeastern Ohio
"Ohio red" flour	19	0.7	Wheat from Ohio and Indiana
Bakelite handles	10	0.4	Formaldehyde from Dow, Michigan and other chemicals from Pittsburgh

^aData from manufactural executives.

in the dissected non-glaciated Allegheny Plateau of southeastern Ohio, especially from the nearby locality. They were accustomed to low incomes.¹ Lower wage scales have been partially an effect of lesser unionization, which is attributed by manufactural executives to the native origin of the people. The area has a higher percentage of native whites than many cities of the region (Table 8). A low labor turnover has been a significant factor in maintaining favorable production costs. Before 1934 there had been no strikes in the area's manufactural establishments. Recently union activity and labor dissension have increased. The organized

¹W.H. Haas, "Influence of Glaciation in Ohio," Bulletin of the Geographical Society of Philadelphia, XV (1917), 26-35.

TABLE 7
SELECTED ITEMS IN PRODUCTION COST IN REGIONAL MANUFACTURAL ESTABLISHMENTS^a

Establishment	Number of Workers	Per Cent of Regional Workers-	Cost Items in Per Cent of Total Value							
			Raw Materials			Labor		Energy		
			Less Than 30	30-60	Over 60	Less Than 30	Over 30	Less Than 5	Over 5	
Diversified Steel Mill	1,224	46.9	X	..	..	..	X	..	X	
Enameling Plant	360	13.8	X	..	..	..	X	.. ^b	X	
Mine Equipment Factory	88	3.4	X	..	..	..	X	X ^c	..	
Bakelite Handle Factory	10	0.4	X	..	..	..	X	X ^d	..	
Spouting Hanger Shop	7	0.3	X	..	..	..	X	X ^d	..	
Screw Plant	2	0.1	X	..	..	..	X	X ^d	..	
"Cold roll" Steel Mill	293	11.2	..	X	..	..	..	.. ^d	X	
Appliance Factory	201	7.7	..	X	..	..	X	X	..	
Bronze Foundry	92	3.5	..	X	..	..	..	..	..	
Animal Fats Refinery	77	2.9	..	X	..	..	X	..	X	
Brewery	59	2.2	..	X	..	..	..	..	..	
Wall Tile Plant	58	2.1	..	X	..	..	..	X ^d	..	
Hardwood Planing Mill	52	2.1	..	X	..	..	X	X ^d	..	
Vacuum Cleaner Factory	16	0.6	..	X	..	..	..	X ^d	..	
Coal Tar Refinery	15	0.6	..	X	..	..	..	X	..	
Oil Burner Factory	10	0.4	..	X	..	..	..	.. ^d	X	
Can Factory	28	1.0	..	..	X	X	..	.. ^d	X ^c	
Flour Mill	19	0.7	..	..	X	X	X	X ^d	..	
Number of Establishments Having Cost Trait			6	10	2	6	12	12	6	
Per Cent of All Regional Workers Employed in Establishments Having Cost Trait			64.9	33.4	1.7	18.5	81.5	23.6	76.4	

^aData from manufactural executives.

^bCoke principal energy source.

^cGas principal energy source.

^dElectricity principal energy source.

TABLE 8

NATIVE WHITE POPULATION IN PER CENT OF TOTAL^a

Dover-New Philadelphia	91.2
Canton	84.5
Massillon	84.2
Warren	78.0
Youngstown	71.9
Cleveland	66.4

^aCompiled from census data.

coal miners and clay workers of the locality and the strong labor unions of larger cities in northeastern Ohio have supported, and perhaps instigated, labor strife. The executives of at least one manufactural plant are very dissatisfied with the present labor conditions in the area. Others fear that they may become less desirable. Costly labor struggles have become a common phenomenon in northeastern Ohio. Perhaps the Dover-New Philadelphia Area is losing some of its former advantages affecting labor costs, but the present industrial structure is based largely upon them.¹ Low labor costs in many establishments are the critical factor which offsets the disadvantages of the location for assembling raw materials and distributing finished goods. Labor costs form over thirty per cent of the value of the finished products in twelve establishments, employing 81.5 per cent of the workers (Table 7).

The low cost of local coal is a significant advantage shared by many competitive communities of the Pittsburgh-Cleveland region (Table 9). "Run of the mine" coal of fair industrial quality was delivered to the factories of the area from mines in Tuscarawas County by truck or rail shipment for \$3.00 per ton in 1936 (Table 10). Many of the establishments use lower priced "slack" screened from lump coal. "Slack" can often be purchased for \$1.00 per ton. The supply of "slack" frequently exceeds the demand since the mines produce mainly domestic screened coal from

¹Unionization and higher wages may be socially desirable, but already they have exerted a powerful uprooting force on industries in northeastern Ohio. The Dover-New Philadelphia Area cannot afford to lose any of its present factories and needs its every asset to attract new ones.

friable deposits. Local coal is the principal energy source in seven establishments which use 81.1 per cent of the regional employees and coal costs are over five per cent of the value of the finished products in five of them which have 75.4 per cent of the total regional workers (Table 7).

TABLE 9
LOWEST PRICED "RUN OF MINE" COAL DELIVERED AT
SELECTED CITIES IN OHIO, 1936^a

Ashtabula	\$3.50	Canton	\$2.50
Cleveland	3.34	Dover	3.00
Lorain	5.15	Mansfield	3.50
Akron	2.81	Cambridge	1.85
Massillon	2.25	East Liverpool	3.00

^aInformation supplied by chambers of commerce.

TABLE 10
ANALYSIS OF TUSCARAWAS COUNTY COAL^a

Moisture	4.50
Volatile matter	43.69
Fixed carbon	48.73
Ash	3.08
Sulphur	2.06
British thermal units	13,589
Fusion point of ash	2,217 degrees F.

^aDover-New Philadelphia Industrial Bureau, 1936 Industrial Survey Cities of Dover and New Philadelphia, Ohio (Dover: 1936), p. 5.

Other features of the area have been favorable in lowering production costs, but have not been as significant in attracting manufactural establishments to the area. Natural gas from the West Virginia fields and steam-generated electrical energy from a plant at Philo, Ohio, are available at the general industrial rates of this portion of Ohio. Large quantities of industrial water may be obtained from wells less than 100 feet deep in the gravel fillings of the valleys. This water does not leave excessive or tightly clinging scale in boilers or cooling machin-

ery.¹ River water is also available, but is less used. It carries much sediment at times. Liquid wastes have been discharged into the streams with little or no treatment. The Bureau of Conservation, Ohio Department of Agriculture, is now making a study of pollution in the area and will probably submit a program which will require treatment of industrial wastes. The abundance of unused and agricultural land on the lower terraces near the railroads has maintained low land values. The tax rates in Dover and New Philadelphia have been lower than those in many industrial cities of Ohio and have been higher than in some of them, (Table 11).

TABLE 11

TAX LEVY-CITY PURPOSES (SCHOOL LEVY NOT INCLUDED)
FOR 1938 IN SELECTED OHIO CITIES^a

City	Rate in Mills	Population 1930
Akron	13.96	255,040
Cleveland	13.52	900,429
East Liverpool	8.70	23,329
Salem	8.40	10,622
Youngstown	7.54	170,002
Niles	7.40	16,314
Alliance	7.00	23,047
Barberton	6.43	23,934
Lorain	5.80	44,512
Warren	5.80	41,062
Cambridge	5.15	16,129
Mansfield	4.97	33,525
New Philadelphia	4.60	12,365
Steubenville	4.40	35,422
Dover	4.20	9,716
Uhrichsville	4.00	6,437
Massillon	3.70	26,400
Coshocton	3.45	10,908
Martins Ferry	3.10	14,524

^aJoseph T. Ferguson and D.S. Heeter, Comparative Statistics, Cities of Ohio, 1938 (Columbus, Ohio: The F.J. Heer Printing Company, 1939), p. 68.

In 1938 the rate for Dover was 4.20 mills and that of New Philadelphia was 4.60 mills. The average rate of one hundred ten Ohio cities was 7.55 mills and the median rate of them was

¹Ibid., p. 31. Dover water has 69 parts of incrustants per million and that of New Philadelphia 196 parts.

5.44 mills. Seventy-five cities had higher rates than New Philadelphia and only thirty-three, including Dover, had lower ones.

The regional manufactural establishments of the Dover-New Philadelphia Area serve four types of markets (Table 12). Six establishments, which employ 71.9 per cent of the workers, produce widely marketed consumer goods. The greater portion of their sales is concentrated in the American manufactural belt in which the area is centrally located. Although goods are sent to scattered outlets throughout the United States, the great population of the manufactural belt,¹ the high purchasing power of its inhabitants,² and the importance of its wholesaling functions make it the dominant area to be considered in marketing strategy for many types of consumer goods.

Four establishments, employing 14.6 per cent of the workers dispose of the greater part of their output to factories of the Pittsburgh-Cleveland and the Detroit regions of the manufactural belt (Table 12). This market was formerly much more important to the area. It took most of the output of the foundry which made moulds used in blast furnaces in casting "pigs" and the two idle steel mills. The loss of these industries inaugurated the unemployment crisis in the area. Although it is not far from the centers of primary metallurgical production and the fabricating plants which are important markets, the area has been unable to compete effectively in lines which do not use much labor in proportion to the weight and value of the finished goods.

Four establishments, employing 8.3 per cent of the regional manufactural workers, sell chiefly to factories or mines located outside the Pittsburgh-Cleveland and Detroit regions (Table 12). They have no special marketing advantage. Four establishments, employing 5.2 per cent of the workers, market consumer goods in scattered markets in Ohio and western Pennsylvania (Table 12). They are faced with strong competition from similar

¹George J. Miller and Almon E. Parkins, Geography of North America (New York: John Wiley and Sons, Inc., 1928), p. 69, contains a map of the principal manufactural region of the United States and states that, "It has about half the population."

²Stephen S. Visher, "Variations Among the States in Wealth," Journal of Geography, XXIV (1925), 26-30, in a series of maps, offers statistical proof that in the states comprising the manufactural belt the wealth per square mile, the wealth per capita, and the percentage increase in per capita wealth are in excess of the national averages.

TABLE 12

PRINCIPAL MARKETS OF REGIONAL MANUFACTURAL ESTABLISHMENTS^a

Products	Number of Workers	Per Cent of All Regional Workers	Principal Markets
<u>Consumer Goods</u>	<u>1,878</u>	<u>71.9</u>	<u>Widely Scattered in United States</u>
Diversified Sheet Steel Wares	1,224	46.9	Major general market in manufactural belt, minor stove market in the South
Enameled Kitchen Ware	360	13.8	Major market in manufactural belt
Electrical and Gas Appliances	201	7.7	Major market in manufactural belt
Composition substitute for clay wall tile	58	2.2	Major market in manufactural belt
Vacuum cleaner Systems	16	0.6	Major market in large cities
"Ohio red" flour	19	0.7	Over 80 per cent of sales on Atlantic Seaboard from Baltimore northward
<u>Producer Goods</u>	<u>382</u>	<u>14.6</u>	<u>Factories of Pittsburgh-Cleveland and Detroit Regions</u>
"Cold roll strip steel"	293	11.2	Automotive industries of Detroit region
Refined animal fats	77	2.9	Rubber industries of Akron, minor markets Cincinnati and eastern, southern, and western textile districts
Bakelite handles	10	0.4	Factories of Pittsburgh-Cleveland region
Bronze screws	2	0.1	Machine industries of Pittsburgh-Cleveland region
<u>Producer Goods</u>	<u>218</u>	<u>8.3</u>	<u>Factories and Mines Outside Pittsburgh-Cleveland Region</u>
Centrifugally cast bronze tubes	92	3.5	Shipyards of Atlantic Coast, minor market to shipyards on Great Lakes

TABLE 12-Continued

Products	Number of Workers	Per Cent of All Regional Workers	Principal Markets
Coal loaders	88	3.4	Mines in eastern Pennsylvania, lesser markets to mines in western Pennsylvania, West Virginia, Kentucky, Ohio, Indiana, and Illinois
Tin cans	28	1.0	Milk condensery at Sheridan, Indiana
Oil Burners	10	0.4	Local factories throughout the United States
<u>Consumer Goods</u>	<u>133</u>	<u>5.2</u>	<u>Scattered in Pittsburgh-Cleveland Region</u>
Beer	59	2.2	Market within 100 miles
Hardwood interior finishings	52	2.1	Canton, Massillon, Akron, Cleveland, Youngstown, and Pittsburgh
Refined coal tar	15	0.6	Eastern Ohio and western Pennsylvania
Spouting hangers	7	0.3	Ohio and western Pennsylvania

^aData from manufactural executives.

plants in the larger cities and have no superior assets in marketing.

As a whole, the regional manufactural structure of the Dover-New Philadelphia Area appears to be adjusted in a major degree to the outstanding advantages of the area's situation (1) for securing raw materials from the metallurgical industries of the Pittsburgh-Cleveland region, (2) for fabricating these with relatively low cost labor and energy sources in an area favoring low overhead costs, and (3) for marketing consumer goods in the American manufactural belt and producer goods to industrial establishments of the Pittsburgh-Cleveland and Detroit regions. Nevertheless, few of the plants individually derive all of these benefits from the situation. The location is a handicap for some of them. All have competitors as desirably located. The

industrial succession within the area left its component manufacturing units struggling for continued existence in their established locations.

Individual Characteristics of Regional Manufacturing Units

The diversified steel mill.--A steel mill, producing widely marketed consumer goods made from galvanized or black steel sheets, is the largest establishment of the area and has 1,224 employees. The localization and present activities of the mill are partly results of an ecological succession which began in 1854 or 1855 with the construction of a blast furnace to use local materials in making pig iron. A puddling mill and rolling mill were erected to fabricate the pig iron. The puddling mill became obsolete and was abandoned. The rolling mill was eventually sold, but its former owners erected another similar mill in which simple rolled and surfaced sheets were produced. Difficulty in selling these products led to the fabrication of wares made from them. The increased use of the area's labor-cost advantages offsets the cost of obtaining ingot steel from Youngstown. Coal, produced in mines owned and operated by the company, was, until recently, delivered by cable car to a screening tipple at the mill (Plate Ib). Formerly, the higher priced lump coal was shipped by rail to urban markets in northeastern Ohio and the slack used in the mill. The fuel costs of the mill were very low. In 1940 the price of coal produced in small non-unionized mines was so low that the company's mines were closed. The owners believe that it will again become profitable to operate the mines and consider their coal lands, which contain sufficient reserves for normal production for a hundred years, as an important support to the integrity of their mill. Water, for boilers and cooling rolls, is obtained from shallow wells. Liquid wastes are carried away by the Tuscarawas River. Lower taxes are obtained by a location outside Dover. The advantages of low labor costs are highly utilized. A small part of the laboring force with modern equipment rolls ingots into sheets of the required thickness and gives them either galvanized or black iron surfaces. A part of the output is sold in these forms in nearby manufacturing markets. Another part is transformed by simple processes into roofing material and metal ceiling stock sold to dealers in Ohio and western Pennsylvania. The greater part of the surfaced sheets are used within

the mill. Galvanized tubs, buckets, garbage pails, ash cans, and many similar products are made and sold throughout the United States, but especially in the urban belt. Air tight stoves, made of black sheet steel, are sold mainly in the South. They are used to burn light fuels for domestic heating. The activities of the diversified steel mill utilize fully the advantages of its situation. The mill is maintained in a state of high efficiency. As a result of adding new lines of production and increased sales in established lines, employment in the mill increased thirty-two per cent in the difficult industrial period from 1929 to 1936.

The "cold roll strip steel" mill.--An experimental cold roll mill was erected in Dover in the developmental stage of the process, largely as a result of family connections with the owners of the diversified steel mill. At first, cold roll strip steel was produced in very thin gauges used in light manufacturing. The Dover plant was able to distribute these effectively to widely scattered markets. As technological improvements made possible the fabrication of heavier gauges, the automotive plants of the Detroit region became the principal users of strip steel. They generally demand small, daily, timed deliveries to reduce stock handling and inventory costs. Dover is 125 miles from Detroit and these deliveries are difficult and costly. The freight costs of transporting ingot steel from the Youngstown Area are another handicap. Although the mill obtains fuel and industrial water at low cost, discharges its liquid wastes into the river, has low tax rates of an unincorporated site, and the local advantages of low labor costs, these favoring conditions do not offset its disadvantages in securing raw materials and shipping its products. The company has established new plants elsewhere when the Dover mill was operating at less than capacity. If this mill, which employs 293 workers, is closed, the unemployment problem of the area will be intensified.

The gas and electrical appliance factory.--An establishment making cast iron, gas, and electrical flat irons and other gas and electrical appliances has 201 employees. These activities developed in a sad iron foundry, originally drawn to the area by advantages in securing pig iron from the blast furnace and marketing its heavy products. As the demand for cast irons declined and the demand for gas and electrical irons developed these lines were added. Other electrical and gas appliances were subsequently man-

ufactured because it was found easier to sell fuller offerings. The freight costs of assembling the partly fabricated materials from the Pittsburgh-Cleveland region are slight in comparison to the value of the finished goods. Local coal is used in melting iron and aluminum for castings. Much purchased electrical energy is used in the plant. Labor constitutes the greatest item of production cost. Thirty-eight per cent of the workers are women employed at low wages in light operations. The location of the plant in the central portion of the urban belt facilitates distribution to wholesale and jobbing houses, department stores, and chain stores. The establishment is apparently operating successfully and the number of workers is slowly increasing.

The bakelite handle factory.¹--Ten workers are irregularly employed in a bakelite handle factory which developed in the area to supply the electrical and gas appliance factory. A varying part of the product is sold to other manufacturers of the Pittsburgh-Cleveland region. Most of the chemicals used are secured from Pittsburgh, but formaldehyde is obtained from Dow, Michigan. Labor is the principal item of production cost. Nearby regular customers constitute the establishment's major competitive asset. Protracted and reoccurring periods of inactivity do not indicate a prosperous future.

The bronze foundry.--A foundry making centrifugally cast bronze tubes has ninety-two employees. It was placed in Dover to utilize a building acquired by the purchase of a mould foundry to eliminate competition. The mould foundry had been located beside the blast furnace to secure molten pig iron for immediate heavy casting. The situation of the bronze foundry is unfavorable for assembling raw materials and disposing of the finished products. Bronze is brought from Bayonne, New Jersey. The greater part of the tubes are sent to shipyards of the Atlantic seaboard and a lesser portion to those along the Great Lakes. The foundry does not share in the general labor cost advantages of the area since the laboring force is a highly technical one which receives wages materially higher than most workers in the community. The relative high values of the raw material and the finished product

¹By definition this establishment belongs in the local classification, but it is so definitely subsidiary to the gas and electrical appliance factory that it has been included with the regional establishments.

lessen the relative significance of the poor situation. The establishment will probably continue operations in Dover.

The tar refinery¹.--A coal tar refinery, which employs fifteen workers, is a vestige of primary metallurgy that has disappeared from the area. It was erected to use tar from by-product ovens which supplied coke for the blast furnace. These are gone, but the large investment in the plant justifies its continued operation. Raw tar is brought from Canton and Massillon, which have by-product ovens but no tar refineries, and from Cleveland and Youngstown. Local coal is used to provide heat. Wages are slightly below those in competitive centers. Paving pitch and brick filler used in road construction are the major products. Refined coke oven tar, damp and water proofing, roof coatings, paint, roofing pitch, creosote oils, wood preservatives, crude naphthalene, crude phenols, and coke are minor products. The plant has no advantage in marketing its products in Ohio and western Pennsylvania that are not shared by refineries near the sources of crude tar. It will probably be abandoned when depreciation and obsolescence have sufficiently lowered the fixed investment.

The hardwood planing mill.--A hardwood planing mill employs fifty-two workers in manufacturing oak flooring and various hardwood interior finishing materials. The activity was at first local in character. Wood from farm woodlots was sawed and planed for the local market. The machinery needed for this type of finishing was so expensive that many lumber dealers did not undertake manufacturing. Those with installed machinery commonly served dealers who did not own machinery. Marketing expansion of this sort was favored by the location of the Dover-New Philadelphia mill near the northern margin of the non-glaciated country. Woodland occupied a larger percentage of the land surface in the rugged non-glaciated portion of Ohio than in the smoother glaciated

¹Perhaps the most pertinent "landscape" in interpreting the present characteristics of the Dover-New Philadelphia Area has disappeared. The tar refinery and the five establishments previously discussed exist within the area as results of an ecological succession which began in either 1854 or 1855 with the operation of a blast furnace based on local resources. These six establishments have 70.3 per cent of the area's regional manufacturing workers. The idle steel mills and the greater share of the unemployment in the area are also parts of the succession.

section.¹ The climatic climax beech-maple was the dominant wood-lot association in the glaciated portion of Ohio. In the non-glaciated part, with its more rapid drainage, the more drought resistant oak woodlands were widespread.² The Dover-New Philadelphia mill had access to large supplies of oak timber which was preferred for interior finishing and a location in proximity to the glaciated section in which there were fewer planing mills and many great cities. The principal markets are now Canton, Massillon, Akron, Cleveland, Youngstown, and Pittsburgh. In order to sustain the large scale production, logs and rough timber are brought from a hundred miles to the southeast. Most of the supply comes from within forty miles. The rapid depletion of the oak timber of Ohio and the increasing cost of long haulage, indicate that the industry must decline in the not distant future. The owners of the mill know this and are attempting to purchase standing timber lands and to practice selective logging on them. This policy cannot be widely applied because the greater part of the timber supply is on scattered farm woodlots which are not for sale at prices low enough to justify purchase.

The wall tile plant.--A plant, which makes a cheaper substitute for clay wall tile and employs fifty-eight workers, developed as a subsidiary of the planing mill.³ A method of treating composition wall board to give it a surface resembling tile was developed and the product was sold at first to lumber dealers purchasing other building supplies. The relatively low cost of the satisfactory substitute led to the development of a national market. The greater portion of the sales are within the urban belt. Chain food stores are important consumers. The supplies of wall board are purchased from a company with several plants in Mississippi and the surfacing materials from paint manufacturers in Cleveland. The production of wall tile and the employment in the establishment are slowly increasing.

¹J.H. Sitterley and J.I. Falconer, "Better Land Utilization for Ohio," Ohio State University and Ohio Agricultural Station, Department of Rural Economics, Mimeograph Bulletin, No. 108 (Columbus, June, 1938), Fig. 27, p. 41.

²Ibid., Fig. 10, p. 18.

³The company also operates two face brick plants and associated clay and coal mines. These are outside the area, but are served by the central office and sales force in Dover.

The flour mill.--A small four mill employs nineteen workers. Although local wheat is purchased at the mill, ninety per cent of the supply comes by rail from Ohio and Indiana. "Soft Ohio red" flour has distinctive characteristics which are unlike those of flours produced from other types of wheat. They are preferred by some consumers and bring especially high prices. The consumers do not generally associate the desired characteristics with all "soft Ohio red" flours, but believe them to belong to a particular brand of flour. The Dover flour mill uses a trade name with a reputation established when cash grain farming was widely practiced in the locality. This reputation enables the mill to function successfully in a location with few advantages.¹ Twenty-five per cent of the flour is sold in New England, thirty-five per cent in New York, and most of the remainder in other parts of the Middle Atlantic Seaboard. The position of the area between the sources of wheat and the markets and in a locality in which by-product dairy feeds can be sold at retail is favorable. The reputation of the local trade name is firmly established and the employment in the mill will probably remain essentially stable.

The enameling plant.--A plant producing kitchen ware and other enameled goods has 360 employees. Free buildings and grounds were a major factor in attracting the company to the area. The situation is favorable for obtaining raw materials, for operating the plant, and for marketing its output. The freight cost of assembling the raw materials is slight in comparison with the total value of the finished wares. Steel sheets are obtained chiefly from the Youngstown Area, clay is imported mainly through Philadelphia and Baltimore, and glass sand is secured from Indiana. Gas, produced in the plant from local coal, is used in continuous ovens in fusing the enamel. The labor cost advantages of the area are highly utilized. Steel sheets are cut into the desired flat shapes; stamped into form; "pickled" to remove impurities; dipped in a mud-like mixture of sand, clay, and coloring material; dried; packed in oven containers; loaded on cars; sent through

¹The industrial successions which have resulted in the presence of the planing mill, the wall tile plant, and the flour mill were, like the successions beginning with the blast furnace, originally based upon the use of local raw materials. The nine establishments localized in this way have 75.3 per cent of the area's regional manufacturing workers.

the ovens; cooled; inspected; redipped; repacked; refired; cooled; inspected; wrapped individually; and packed for shipment. Women perform many of the lighter tasks and make up approximately half of the employees. Their wages are relatively low, ranging from eleven to fourteen dollars a week. The women, for the most part, belong to families of manufactural workers in the area and those of coal miners and clay workers in the vicinity. The number of women desiring manufactural employment exceeds the demand for their services in the area. The location of the plant facilitates economical distribution to wholesale establishments, jobbing houses, department stores, and chain stores in the urban belt. The favorable situation of the plant and its excellent equipment have enabled it to maintain stable sales and employment through the critical period since 1929.

The animal fats refinery.--A refinery producing stearic acid, red oil, and glycerine from packing house by-products has seventy-seven employees. It was located in the area partly because a suitable building, erected for a non-successful rubber factory, could be obtained at low cost. The raw materials are chiefly obtained from Detroit, Cleveland, Pittsburgh, and Cincinnati and are secured to a lesser extent from Chicago, St. Louis, Omaha, and other mid-western meat packing centers. The products are refined with local coal. The principal product is red oil delivered by truck to the rubber industries of the Akron Area. Glycerine is sent to soap manufacturers of Cincinnati. Stearic acid is sold mainly to textile plants in the eastern and southern textile districts. Minor shipments are made to textile mills on the Pacific coast. The establishment seems to be operating successfully and the number of employees is not likely to change materially.

The brewery.--A brewery with fifty-nine employees was localized in the area mainly because the building and name of a former brewery could be obtained at low cost. Water and coal are obtained locally. Malt is purchased in Milwaukee and hops in Oregon or from importers of Czechoslovakian hops. The market lies entirely within one hundred miles of the plant. Advertising is limited to Ohio. The principal sales centers are Canton, Akron, Youngstown, Cleveland, Newark, and Zanesville. The brewery is unable to compete on the basis of price with those of larger cities. It has a daily capacity of only 300 barrels and produces

only a minor part of the beer consumed within its service area. Employment in the brewery will probably remain approximately constant.

The can factory.--Twenty-eight workers are employed in manufacturing evaporated milk cans. The establishment was placed in the area to use a building erected for a vegetable cannery.¹ Tinned steel sheets are obtained from the Wheeling Area. Natural gas is used in the heating processes. The finished cans are sent to a milk condensery at Sheridan, Indiana. The situation of the plant is not favorable for assembling the raw materials or for marketing the bulky cans. It is frequently inactive.

The mine equipment factory.--An establishment which makes coal conveyors, screens, loaders, and trucks has eighty-eight employees. Types of coal handling equipment suitable for small mines were developed in a small combined foundry and machine shop serving the mines of Tuscarawas County. These found widespread markets. The anthracite field of eastern Pennsylvania and the bituminous fields of western Pennsylvania, West Virginia, and Ohio, now constitute the main market areas. Kentucky and Illinois have minor markets. Pig iron for castings is obtained chiefly from the Pittsburgh and Youngstown Areas. Coke for smelting comes from the Connellsville Area. Hardwood for frames is purchased from the local planing mill. Low labor costs are a major advantage, since these costs are the largest item in total production costs. Frequently reoccurring periods of partial or suspended operation indicate that the employment in the plant is more likely to decline than to increase.

The oil burner factory.--Ten workers are employed in a small machine shop in which oil burners to be installed in furnaces are manufactured. The burners were developed in machine shops previously serving the locality. Castings are purchased in the Pittsburgh-Cleveland region. The low wages paid to machinists constitute the major competitive advantage of the shop. The burners are sold throughout the United States to small local

¹Free or low-priced buildings were a significant factor in the localization of the enameling plant, the animal fats refinery, the brewery, and the can factory. These establishments have 19.9 per cent of the regional manufactural workers. The bronze foundry was placed in the area to use a building obtained by purchase to eliminate competition. It has 3.5 per cent of the regional manufactural workers.

furnace manufacturers. No increase in employment is probable.

The spouting hanger shop.--An establishment manufacturing wire hangers used to fasten water spouting to buildings has seven employees. They are partly employed in the operation of the sheet metal shop in which the hangers were developed. The wire comes from Cleveland and most of the finished hangers are sold in Ohio and western Pennsylvania. Any important increase in the number of employees is improbable.

The vacuum cleaner factory.--An establishment manufacturing vacuum cleaner systems used chiefly in schools, hotels, and other large buildings, has sixteen employees. Most of the castings, machined parts, and metal reinforced tubing are purchased in a fabricated form in the Pittsburgh-Cleveland region. The designing and sale of the systems constitutes the greater portion of the work. The plant location facilitates selling, distribution, and installation in the urban belt. Competition with similar firms is great and the market demand limited to such an extent that any considerable increase in employment is improbable.

The screw plant.--Two workers operate a small screw plant. Their products can be sold competitively only in lots of less than ten thousand. The machine tool industries of the Pittsburgh-Cleveland region are the main customers. No expansion of employment is probable.

The Regional Manufactural Prospect

Although the future is always uncertain, relative stability in the total regional manufactural employment appears to have been attained and an increase may begin. The findings for the individual regional establishments indicate the existence of three groups with different outlooks. The first group includes those establishments which have recently experienced difficulties which may foreshadow decline or disappearance. The "cold roll" steel mill, the mine equipment factory, the can factory, the bakelite handle factory, the tar refinery, and the planing mill are in this class. They have 18.7 per cent of the area's regional workers and their loss would seriously affect the entire community. However, they have survived a highly critical and competitive period. Much additional decline is not probable in the immediate future.

The second group includes those establishments which have

maintained relatively stable sales and employment through the past difficult decade, but which do not have sufficient advantages to support much hope of significant expansion. The bronze foundry, the animal fats refinery, the brewery, the flour mill, the vacuum cleaner plant, the oil burner factory, the spouting hanger shop, and the screw plant, belong to this group. They have 10.7 per cent of the regional manufactural workers.

The third group consists of those establishments which have increased sales and employment during the depression and have revealed a strength that may lead to considerable expansion with improved general economic conditions. It consists of the diversified steel mill, the enameling plant, the gas and electrical appliance factory, and the wall tile plant. These factories in 1936 had 70.6 per cent of the regional manufactural workers. Between 1929 and 1936 large increases in employment in the diversified steel mill and the wall tile plant and small ones in the enameling plant and appliance factory added four hundred thirty-one workers. In the same period the localization of the animal fats refinery and the brewery brought employment for one hundred seventeen new regional workers.

Although the gain of 548 workers through expanded or new employment is a favorable omen, serious unemployment exists. In 1929 the regional manufactural establishments of the area had 3,861 employees, while in 1936 there were only 2,611. The removal of two steel mills and the failures of a vacuum cleaner company and a shirt factory caused the loss of employment for 1,798 workers. The net loss for the period was 1,250 workers, or 32.4 per cent. During this interval the population of the area increased 10.3 per cent. New industries are urgently needed.

In the past internal industrial successions which began with the utilization of raw materials produced in the vicinity were significant factors in the localization of nine establishments which have 75.3 per cent of the area's regional manufactural workers. The raw materials for the present industries come from distant sources. The vicinity no longer has resources which are apt to supply raw materials attracting new industries.

Free, low priced, or previously owned buildings were factors in the localization of five establishments with 23.4 per cent of the present regional manufactural workers. The brewery and the animal fats refinery have been attracted partly through

such buildings since 1929. The area has five factory buildings which may help in drawing new industries. The idle steel mill on the lower terrace in New Philadelphia is an excellent structure, desirably situated (Plate VIb). The idle steel mill in Dover is old and a much less desirable property, although it is well situated. Part of the bronze foundry is unused and this space is available for lease. The idle vacuum cleaner factory, near the enameling plant, and the old shirt factory in the New Philadelphia commercial core are suitable for light manufacturing. These buildings form an important asset of the community. They should be used as inducements in attempts to secure the localization of new industries.

Vigorous efforts should be made to attract industries. The chamber of commerce or some other group should actively strive to establish contacts with manufactural establishments and to induce them to locate in the area. Efforts should be made to preserve the area's advantages in low labor costs, utility rates, and low taxes. It is desirable that the people of the area realize (1) that most of the regional manufactural establishments of the area need lower labor costs to offset disadvantages in their situation for securing raw materials and marketing their products; (2) that higher wages, strikes, and other labor conflicts will lessen the probability of attracting new industries and may drive some of the established ones from the area; and (3) that lower wages, to the degree offset by the lower living costs in the area, do not constitute an unfair discrimination. If, as appears likely,¹ lower industrial electrical rates would result from either an extension of service from the Dover generating plant to include New Philadelphia or the establishment of a separate electrical system for New Philadelphia, steps should be taken immediately to secure this advantage.²

¹In view of the low tax rates of Dover and New Philadelphia, there is little probability of affecting economy by uniting other functions of the municipalities.

²Although profits from the Dover municipal electrical generating plant are liquidating the cost of the system, although the city receives its electrical energy free, and although the rates charged by the city of Dover are below those charged by the public utility serving New Philadelphia; the success of the Dover undertaking does not provide a "yardstick" proving the benefits of municipal ownership elsewhere. Dover has cheap coal and produces power at lower costs than would obtain in many other places.

If these recommended policies are carried out, the regional manufactural prospect is not as unfavorable as indicated by the existing unemployment. The area has advantages which are likely, but not certain, to attract new industries. Recovery is apt to be discouragingly slow. The community is in competition with many industrial cities with similar unemployment and equal advantages or superior ones.

Section 2. Sub-regional and Local Functions

Sub-regional and Local Manufacturing

The Dover-New Philadelphia Area has 29 workers in eight sub-regional establishments primarily serving the locality outside of the area and 231 workers in over one hundred establishments chiefly serving the area (Table 13). These establishments are important to the inhabitants of the area and its hinterland in supplying goods and services, but employ only 1.1 per cent of the area's population. Local manufactural establishments of Canton and other nearby cities perform a share of these functions which apparently exceeds the contribution of the Dover-New Philadelphia Area. In this respect, the Dover-New Philadelphia Area has suburban traits.

The twenty-three establishments which manufacture products employ only fifty-four workers in production. A small tile plant makes rectangular unglazed building tile. Local clay is mined and local coal purchased. Almost all of the products are sold at the yard. The greater part of the output is used within ten miles of the plant and essentially all of it within twenty miles. A small foundry makes dies on order for clay plants of Tuscarawas County. These are used in machines which press wet clay into form and are small interchangeable parts of larger equipment. The foundry also makes castings upon order for repair work throughout the country. Two small hatcheries obtain eggs from selected local flocks and sell young chickens to farmers. They produce only part of the young chickens for this area. Twelve establishments with twenty-eight workers are engaged in producing foods, ice, and soft drinks. Bakeries sell goods to customers from within and

The rates in New Philadelphia are those fixed by public regulation. These rates are probably fair, since the power is transmitted a considerable distance. Nevertheless, there is a local advantage in the Dover-New Philadelphia Area which will probably continue and this advantage should be fully utilized.

TABLE 13

SUB-REGIONAL AND LOCAL MANUFACTURAL ESTABLISHMENTS^a

Type of Manufactural Establishment	Number of Es ^b tablishments	Number of Workers
Sub-regional Making Products		
Tile plant	1	5
Foundry	1	4
Chicken Hatcheries	2	2
Local Making Products		
Bakeries	4	4 ^c
Slaughter Houses	3	6
Ice Cream Plants	2	12 ^c
Ice Plants	2	4 ^c
Soft Drink Plant	1	2
Job Printing Shop	2	3 ^c
Newspapers	2	6 ^c
Cement Works	3	6
Sub-total Making Products	23	54
Sub-regional Serviential		
Feed Mills	3	3
Local Serviential		
Furnace, Tin, and Plumbing Shops	10	16
Electrical Service Shops	11	10 ^c
Paper Hanging and Painting Shops	..	10 ^c
Laundry and Cleaning Plants	12	26 ^c
Tailor Shops	3	3
Shoe Repair Shops	4	4
Blacksmith Shop	1	1
Machine Shop	1	8
Welding Plants	3	5 ^c
Automotive Repair Shops	36	76 ^c
Sub-total Serviential	84	162
Sub-regional Construction		
Steel Erection Shop	1	15
Local Construction		
Carpenter, Plaster, and Brick-layer Shops	..	29
Sub-total Construction	1	44
Grand total	108	260

^aData based on interviews.

^bIncludes establishments using parts of stores.

^cEmployees in non-manufacturing work not counted.

without the area in retail shops and supply restaurants and lunch rooms within the area, but do not sell other baked goods for resale. Very large bakeries in Canton, Navarre, and Uhrichsville sell more baked goods within the area than are supplied by the local bakeries. Ice cream is marketed through dealers in a considerable service area in which competitive brands produced outside the area are also sold and is sold directly to consumers through shops operated in conjunction with the plants. Ice is sold within a similar, but larger, service area. Competitors producing ice are more distant and the costs of transporting ice in proportion to value are greater than for ice cream. Ninety-five per cent of the ice sales are made within the Dover-New Philadelphia Area. The service areas of the slaughter houses are relatively large, since one of the establishments manufactures a distinctive "German" sausage that is popular in the vicinity and since a grocery jobber operates a slaughter house supplying part of the fresh meat sold to its customers. All of the animals used are purchased from farmers of the vicinity. A soft drink manufacturer supplies a large area with one of the competitive brands sold within it. Job printing is done for a considerable area. The local newspapers have many subscribers in an extensive area surrounding the Dover-New Philadelphia Area and regularly publish sections devoted to news of various outlying communities. The large extent of the area served is made possible by the regularity, speed, and low cost of mail distribution. Cement building blocks are made and sold in a relatively restricted area. Cement burial vaults are sold in a much more extensive area due to the greater value of the product and the absence of competition. The production of goods within the Dover-New Philadelphia Area is limited to bulky goods of low value in proportion to weight, to perishable commodities, and to goods which must be supplied quickly upon demand. The service areas are in the main shared with outside competitors who supply a larger portion of the service than the establishments of the area. This competition limits the number and size of establishments producing goods and is the principal factor explaining the low percentage of the total population engaged in manufacturing to supply local markets.

The serviential manufactural establishments are much more fully developed. There are eighty-four establishments in which one hundred sixty-two workers are engaged in manufacturing. Feed

mills grind local grain, on a custom basis, for farmers living near the area. Establishments maintaining and repairing household equipment and homes are numerous and employ thirty-six workers. Nineteen establishments and thirty-three workers are engaged in the maintenance of wearing apparel. Five establishments and fourteen workers are engaged in maintaining equipment used in factories and mines and in servicing trucks used in hauling coal. Thirty-six establishments and seventy-six workers are engaged in automotive repairing. Within their respective service areas the serviential manufactural establishments of the area supply most of these services.

Construction employs forty-four workers. The steel erection shop does part of its work for mines and factories lying in a considerable hinterland. The service areas of the other establishments are much more limited.

The individual, the mean, and the average distances of the outer limits of the various service areas from the Dover-New Philadelphia Area vary significantly in different directions (Fig. 12 and Table 14). To the west the outer limit of service attains its maximum remoteness from Dover-New Philadelphia, the arrangement of the boundaries is relatively concentric, and the spacing between them somewhat more regular than elsewhere. Millersburg, a large town, is 21.2 miles distant and only a small town and a village lie between it and Dover-New Philadelphia (Figs. 12 and 13). To the east Carrollton, a town of similar size to Millersburg, lies five miles nearer Dover-New Philadelphia and four small villages intervene. The distance to the outer service limit is somewhat less than on the west and there are more eccentric features. To the south the cities of Uhrichsville, Dennison, and Newcomerstown, three towns, and seven villages lie within seventeen miles of Dover-New Philadelphia. The pattern of limits is eccentric and complex, a result of the vigorous competition between closely spaced urban centers. To the north the much larger cities of Canton and Massillon, eight towns, and three villages lie within eighteen miles of Dover-New Philadelphia. The limits of the service areas are closely spaced and they extend to lesser distances from the Dover-New Philadelphia Area than elsewhere. The longer axis of the service areas extends in a general east-west direction across the drainage and relief patterns and the shorter one in an approximately north-south direction along

them (Figs. 3 and 12). The various irregularities in the pattern of service boundaries result mainly from the competition between urban centers. The centripetal attraction of a city is chiefly a function of its size and the distance to it. The entire umland of Dover-New Philadelphia lies within the orbit of Canton's centripetal attraction.

TABLE 14
DISTANCE TO LIMITS OF SUB-REGIONAL AND LOCAL
MANUFACTURAL SERVICE AREAS IN MILES

	North	South	East	West
Tile	1	4	11	5
Ice	8	10	11	9
Baked Goods	9	3	13	11
Ice Cream	11	5	11	22
Soft Drinks	10	10	14	17
Prepared Meats	8	13	15	15
Young Chickens	11	15	16	18
Cement Burial Vaults	13	19	18	24
Newspapers	15	23	19	25
Feed Grinding	5	2	4	3
Paper Hanging	6	3	5	2
Automotive Repairing	9	8	11	13
Welding	10	9	13	11
Machine Shop Repairs	12	10	13	17
Steel Erection	12	19	17	23
Average	9.3	10.2	12.7	13.0
Median	10	10	13	15

Retail and Allied Services

Service Limits.--Commercial distribution and allied professional services employ 2,002 workers, or 7.97 per cent of the population of the Dover-New Philadelphia Area. The areas served by retail and serviential establishments reach considerable distances beyond the cities. The pattern of limits reveals: (1) marked variation in the extent of the several types of service areas; (2) a broad concentric arrangement; (3) a unilateral shortening of distances to the north; and (4) numerous lesser eccentric features (Fig. 14).

These characteristics result partly from the natures of the services and partly from external competition. The limits reveal that goods of low value in proportion to bulk and weight are not generally sold to inhabitants from as great distances as

ones of higher relative prices (Table 15). The trade areas for furniture and automobiles do not conform in this respect. The restricted extent of the furniture service area is probably due to uncommonly strong competition from stores at Strasburg and at Dennison. The automotive sales agencies have assigned territories. The most extensive of these are the ones of the higher priced cars and the smallest those of the lower priced ones. The smaller extent of the automotive sales areas in comparison with those of hardware, food, drug, variety goods, and wearing apparel service areas suggests that the automotive agencies are more closely spaced under the system of assigned territories than they would be under free competition. The bank service area is probably restricted by competition of banks in small outlying towns which offer facilities similar to those in Dover-New Philadelphia. Medical and theatrical service areas of Dover-New Philadelphia are more extensive, probably because the services are superior to those of the smaller competitive centers.

TABLE 15

DISTANCE TO LIMITS OF RETAIL AND ALLIED SERVICE AREAS IN MILES

	North	South	East	West	Average
Feed Stores	3	3	7	3	4.00
Lumber Yards	3	2	8	4	4.25
Furniture Stores	5	5	8	9	6.75
Ford Agency	5	7	8	4	6.00
Chevrolet Agency	6	10	8	5	7.25
Buick Agency	7	17	8	9	10.25
Hardware Stores	9	17	9	14	12.25
Food Stores	9	17	11	13	12.50
Drug Stores	9	15	13	14	12.75
Variety Stores	9	19	13	14	13.75
Wearing Apparel Stores	11	20	18	19	17.00
Banks	3	12	8	4	6.75
Telephone Service	3	4	8	17	8.00
Doctors	7	7	12	15	10.25
Theaters	14	16	19	23	18.00
Average	6.86	11.40	9.33	11.13	9.98

The unilateral shortening of the distances to most of the service limits on the north shows the competition of Canton and Massillon, urban centers maintaining service facilities as good as, or better than, those of Dover-New Philadelphia. The quality

of services offered is mainly a function of the size of the center. Eccentric features in the pattern of limits mark the competition of Strasburg, Uhrichsville-Dennison, Sugar Creek, and Coshocton. Deviation from regular concentricity is most striking in the distribution of goods of low value in proportion to bulk, goods used in sufficient quantities to sustain closely spaced stores, and those services which are most nearly standardized. The degree of concentricity is generally greatest in the most extensive service areas and is least for the smaller ones.

The shares of Tuscarawas County's stores and the parts of the county's retail sales which are grouped in Dover-New Philadelphia are greatest for the type of establishments having the most extensive service areas and they are least for the kinds with the smaller ones (Tables 15 and 16). Shoe stores and automotive sales establishments have high percentages of the total stores and sales, as would be expected from their extensive service areas. The intermediate percentages for food and drug stores would be anticipated from the size of their service areas. Establishments with small service areas, such as the ones selling feeds, fertilizers, farm machinery, and lumber, are included in the item, "all others," and probably account for the relatively low concentration in Dover-New Philadelphia of stores and sales in this classification.

Subdivisions of the trade umland.--The trade umland of Dover-New Philadelphia includes twenty-two subdivisions in which the habitual trade relations of the inhabitants are different from one another in ways affecting the trade of Dover-New Philadelphia, as well as other subdivisions which were not delimited because the variation in trading habits does not significantly affect the trade in Dover-New Philadelphia (Fig. 15). On the basis of similar dependence upon Dover-New Philadelphia stores, these subdivisions fall in seven types and three zones.

In the inner zone by far the greater portion of the retail distribution is performed by the establishments of Dover-New Philadelphia and its limit somewhat roughly coincides with the outer margin of territory served by almost all kinds of manufacturing, retail, and serviential establishments of Dover-New Philadelphia (Figs. 12, 13, 14). The zone contains three types of trading areas. Type A is the urban part, within it daily shopping at one of the commercial cores or at neighborhood stores

TABLE 16

THE DOVER-NEW PHILADELPHIA SHARE OF TUSCARAWAS
COUNTY'S STORES AND RETAIL SALES^a

Type of Establishment	Tuscarawas County		Dover-New Philadelphia		Percentage of County Total in Dover-New ^b Philadelphia	
	Number of Stores	Sales in Thou- sands of Dollars	Number of Stores	Sales in Thou- sands of Dollars	Stores	Sales
Shoe Stores	16	351	10	265	63	76
Jewelry Stores	8	176	4	133	50	76
Automotive Agencies	34	3,236	16	2,354	47	73
Furniture Stores	13	670	7	415	54	62
Restaurants and lunch rooms	33	358	18	202	55	56
Food Stores	275	4,919	129	2,631	47	53
Drug Stores	26	584	10	301	38	52
Garages and Gasoline Stations	162	2,191	56	1,014	35	46
All others	308	9,102	118	4,119	38	45
Total	875	21,544	378	11,477	43	53

^aCompiled from data in Fifteenth Census of the United States: 1930, Retail Distribution, Ohio. (Washington: Government Printing Office, 1932), p. 38 and pp. 66-67.

^b32.4 per cent of County Population in Dover-New Philadelphia.

is characteristic. Beyond the urban part is Type B. The trading practices of the inhabitants are similar to those of the urban part except that grocery and other regular purchases are made for longer intervals of time, that they do not depend much upon neighborhood stores, and that their per capita purchases are lessened by the production of subsistence foods. Within type B, coal mines near Johnstown, Rosswell, Barnhill, and Wainright, the clay plants at Parrall and Goshen, and a rural community at Winfield have developed population groupings sufficiently large to maintain neighborhood grocery stores. The areas served by these stores consti-

tute Type C. A grocery store of New Philadelphia maintains a daily huckster service within Type A and to Parrall, Johnstown, New England, Rosswell, Barnhill, Wainwright, and Goshen in the inner zone to Midvale in the intermediate zone. The huckster service is an important factor in food distribution to the inhabitants living in these centers and along the roads joining them.

In the intermediate zone the proportion of the total purchases of the inhabitants which are made in Dover-New Philadelphia is decidedly less than in the inner zone, the share of the purchases made in the establishments of other villages, towns, and cities is much greater, and shopping trips to Dover-New Philadelphia are less frequent. For the most part, the zone lies beyond the limits of service areas for distributing feeds, fertilizers, lumber, and furniture and for performing banking services (Figs. 14 and 15). The zone contains three types of trading areas. In the D type, general stores located in New Cumberland and Stone Creek supply the needs of the inhabitants for purchases needed frequently or quickly. Weekly shopping trips are usually made to Dover-New Philadelphia and most of the larger purchases are made there. In the E type of trading area, the inhabitants are served by similar general stores located in Zoar, Zoarville, Dellroy, Sherrods-ville, Midvale, Gnadenhutten, Tuscarawas, Port Washington, Ragersville, and Dundee. The weekly shopping and larger purchases are generally divided between Dover-New Philadelphia and a rival center which performs a lesser proportion of the service than Dover-New Philadelphia. The rival trade center used by the inhabitants of the Dundee, Zoar, and Zoarville areas is Strasburg; that by the inhabitants of the Dellroy and Sherrods-ville is Carrollton; that by the inhabitants of Midvale, Gnadenhutten, Tuscarawas, and Port Washington areas is Uhrichsville; and that by the inhabitants of the Ragersville area is Sugar Creek. The inhabitants of the F trading type are served by the stores offering specialized types of merchandise at Uhrichsville-Dennison, Strasburg, and Sugar Creek. The population groups at these centers are enough larger to sustain better stores than those in the smaller centers. The services offered by these establishments are sufficiently attractive to materially lessen the proportion and frequency of shopping in Dover-New Philadelphia, but they are insufficient to overcome entirely the centripetal pull of the Dover-New Philadelphia estab-

lishments, particularly for goods requiring large unit expenditures. The extent of dependence upon Dover-New Philadelphia establishments decreases in the larger centers. It is greatest in Sugar Creek, less in Strasburg, and least in Uhrichsville-Dennison.

The outer trade zone is, like the inner and intermediate zones, divided into areas in which the trading habits of the inhabitants differ, but these divisions were not delimited since the trade relations with Dover-New Philadelphia were virtually uniform. The role of Dover-New Philadelphia is distinctly minor. Most of the services are performed by the stores of other centers (Figs. 13 and 15). The prime trading centers to the north are Canton, Massillon, Orville, and Wooster; to the east they are Carrollton and Canton; to the south they are Cambridge, Uhrichsville-Dennison, Newcomerstown, and Coshocton; and to the west the prime center is Millersburg. Some of the people are drawn to New Philadelphia for public business and incidentally shop there. Others are attracted to Dover-New Philadelphia by service facilities superior to those of their regular trading centers.

Merchants' estimates of the relative proportion of their trade with the inhabitants of each zone indicate that the trade of the inner zone largely supports most of the establishments of Dover-New Philadelphia, that the intermediate zone is of considerable importance to them, and that the outer zone is of relatively slight importance (Table 17). The average of all types of establishments reporting indicates that the inhabitants of the inner zone make 75 per cent of the purchases, that those of the intermediate zones take 20.2 per cent of the sales, and that those of the outer zone buy 4.8 per cent. These averages are based upon reports from larger establishments and the smaller ones are likely to draw less trade from the intermediate and outer zones. The conclusion that the retail trade with customers from the intermediate and outer zones forms a little less than twenty-five per cent of the total is confirmed by facts revealed in the census of distribution (Table 18). It is probably that the per capita sales in towns of Tuscarawas County other than Dover-New Philadelphia approximate the per capita purchases of all the county's urban dwellers. Although the per capita sales include those to external customers, these are more or less balanced by purchases of their residents in Dover-New Philadelphia. The conclusion, based upon census data and these assumptions, is that approximately 23.7 per

cent of the trade of Dover-New Philadelphia is with non-residents. This conforms closely with the 25.0 per cent which was the average of estimates of external trade as made by merchants, and substantiates their judgment.

TABLE 17

THE PROPORTION OF THE TOTAL SALES OF SELECTED ESTABLISHMENTS WHICH IS DRAWN FROM THE VARIOUS TRADE ZONES^a

Type of Goods Sold	Per Cent of Total Sales		
	Inner Zone	Intermediate Zone	Outer Zone
Feeds and Fertilizers	95	5	0
Lumber	90	10	0
Furniture	85	13	2
Foods	70	25	5
Drugs	85	14	1
Hardware	80	15	5
Variety Goods	50	35	15
Wearing Apparel	60	30	10
Automobiles	60	35	5
Average of all Types	75.0	20.2	4.8

^a Twenty-five merchants made reports upon the per cent of their trade which was drawn from each of the zones. These reports were averaged to obtain the proportions given for each type of establishment.

TABLE 18^a

ESTIMATED DIVISION OF RETAIL TRADE AT DOVER-NEW PHILADELPHIA BY RESIDENTS AND BY OTHER PURCHASERS

Total Retail Trade at Dover-New Philadelphia	\$ 11,477,000
Estimated Division Assuming That the Per Capita Purchases of Dover-New Philadelphia Residents Equal Per Capita Sales in Other Towns of Tuscarawas County	
Residents of Dover-New Philadelphia	8,757,000
Other Purchasers	2,720,000
Per Cent of All Sales to Other Purchasers	23.7

^a Computations based on data from U.S. Bureau of the Census, Retail Distribution, Ohio (Washington: United States Government Printing Office: 1932), p. 38.

On the basis of the merchants' estimates of the proportion of their trade drawn from each zone, the census data showing the total retail trade volume, and estimates of the population

of each zone, it appears that the average inhabitant in the inner zone contributes as much business to Dover-New Philadelphia merchants as four such residents in the intermediate zone or twenty occupants of the outer zone (Tables 19, 20, and 21). There is also great disparity in the intensity of service to the inhabitants of each zone for individual types of trade. For example, the inhabitants of the intermediate zone purchase about half as many shoes in Dover-New Philadelphia as the residents of the inner zone, but they spend only one-seventh as much in the area's furniture stores and the occupants of the outer zone buy in New Philadelphia one-seventh as many shoes, but less than one-hundredth as many drugs as dwellers in the inner zone.

TABLE 19

ESTIMATED TOTAL PER CAPITA TRADE AT DOVER-NEW PHILADELPHIA
WITH RESIDENTS OF THE TRADING ZONES

	Inner Zone	Intermediate Zone	Outer Zone
Population Estimate ^a	29,835	31,824	37,791
Per Cent of Population	30	32	38
Per Cent of Sales-- According to Average of Dover-New Phila- delphia Merchants Estimates	75.0	20.2	4.8
Total Dover-New Phila- delphia Retail Sales Divided According to Merchants Estimates	\$8,597,750	\$2,318,354	\$549,896
Per Capita Purchases in Dover-New Philadelphia	\$ 288.18	\$ 72.85	\$14.55

^aEstimates based upon population data by minor civil divisions in the census of 1930.

The differences in the intensity of service by Dover-New Philadelphia establishments result mainly from the competition between urban centers. These are closely spaced in the portion of the Pittsburgh-Cleveland Region of the American Manufacturing Belt near Dover-New Philadelphia (Fig. 13). The inner trade zone, which is served primarily and dominantly by Dover-New Philadelphia establishments, extends from three to eight miles

beyond the cities. The Dover Commercial Core and the New Philadelphia Commercial Core are largely sustained by the urban dwellers and have sufficient attractive power to draw most of the trade from these distances. The limit of the inner zone lies nearer to the smaller urban centers of the intermediate zone than to the larger and more attractive Dover-New Philadelphia center. The variation in distances to the boundary in various directions from Dover-New Philadelphia is a function of urban spacing.

TABLE 20

ESTIMATED PER CAPITA PURCHASE IN DOVER-NEW PHILADELPHIA
BY RESIDENTS OF THE TRADING ZONES^a

Purchases of:--	Inner Zone	Intermediate Zone	Outer Zone
Foods	\$ 61.73	\$ 14.38	\$ 3.48
Automobiles	44.28	25.89	3.12
Drug Store Goods	8.58	1.32	0.08
Shoes	5.33	2.49	0.70
Furniture	11.82	16.69	0.22
Other Products	156.44	27.08	7.05
All Types	288.18	72.85	14.55

^aFormula for estimate:

Per capita Purchases = Total Sales according to Census Data X
per cent of sales to customers from each zone as given by mer-
chants ÷ estimated population of zone.

TABLE 21

NUMBER OF AVERAGE CUSTOMERS IN INTERMEDIATE AND OUTER ZONES
REQUIRED TO EQUAL ONE AVERAGE CUSTOMER IN THE INNER ZONE^a

Type of Sales	Intermediate	Outer
Food	4.2	17.7
Automobiles	1.7	14.2
Drugs	6.5	107.2
Shoes	2.1	7.6
Furniture	7.0	53.7
Other Purchases	5.8	22.2
All Purchases	4.0	20.0

^aFormula: $\frac{\text{Inner Zone Purchase}}{\text{Intermediate or Outer Zone Purchase}} = \text{Customer Equivalent}$

The intermediate zone extends from the periphery of the inner zone to a limit approximately thirteen miles to the east, south, and west of Dover-New Philadelphia and six miles to the north of it. Within this zone Uhrichsville-Dennison, Strasburg, and Sugar Creek maintain diversified retail facilities that are strong competitors of Dover-New Philadelphia. The trade attracted by them is a major reason why the per capita purchases by residents of the intermediate zone in Dover-New Philadelphia are about one-fourth of those of residents of the inner zone. Since the three centers contain 13,166 inhabitants, or only 41.4 per cent of the dwellers in the intermediate zone, the total trade of Dover-New Philadelphia is apparently lessened by the retail competition of these centers to a greater extent than it is augmented by the presence of their inhabitants. Each of the trade centers is primarily sustained by a local urban grouping with more than 1,000 inhabitants.¹ Population groupings with 1,000 or more inhabitants spaced at distances of more than three miles and less than thirteen miles from Dover-New Philadelphia reduce the total trade of its merchants. Only \$2,318,354 of the total trade at Dover-New Philadelphia is attributable to the intermediate zone according to the merchants' estimates. The census of distribution shows that the total sales at Uhrichsville, Dennison, and Strasburg were \$4,638,000² or more than twice the trade from the intermediate zone at Dover-New Philadelphia. Sugar Creek is also a competitor which probably reduces the trade in Dover-New Philadelphia. Smaller towns within the intermediate zone do not have this effect. The general stores of the towns and villages that are the nuclei of the D and E types of trading areas in the intermediate zone resemble in appearance neighborhood stores of the C type trading area in the inner zone. The populations that support these stores probably increase the trade at Dover-New Philadelphia by a greater extent than the general stores reduce it. The outer limit of the intermediate zone lies more than halfway from Dover-New Philadelphia toward smaller competitive centers--Newcomerstown,

¹The 1930 populations were:
Uhrichsville-Dennison 10,966
Strasburg 1,305
Sugar Creek-Shanesville 1,389

²U.S. Bureau of Census, Retail Distribution, Ohio, op. cit., p. 38.

Millersburg, and Carrollton (Fig. 13). It extends approximately halfway toward centers of a similar size--Coshocton and Wooster (Fig. 13). It reaches less than halfway toward larger cities--Cambridge, Massillon, and Canton (Fig. 13).

The outer trade zone varies from approximately four to seven miles in width. The trade passes outward toward rival centers to a greater extent than toward Dover-New Philadelphia. Newcomerstown, Carrollton, and Millersburg draw a greater share of the trade from adjoining areas even though they are smaller than Dover-New Philadelphia. Cambridge, Coshocton, and Wooster pull the majority of customers from the sections nearer to them. Massillon and Canton draw the greater part of the trade even from areas which are nearer to Dover-New Philadelphia. Canton, especially, because of the great attraction of the shopping district, draws trade not only from most of the outer trading zone but also from the intermediate and inner zones.

Jobbing Functions¹

Although the 1930 census of distribution lists twenty-four wholesale establishments in Dover-New Philadelphia as employing one hundred five persons in distributing at wholesale merchandise valued at \$2,875,264,² independent jobbing and wholesaling functions are not important. Most of the workers are primarily engaged in manufacturing, retailing, and horticultural production and the jobbing distribution is incidental to these activities. Food distribution is the only type performed in total separation from other functions. A wholesale candy distributor, three establishments selling fruits, vegetables, and some groceries, employ twenty-nine workers in servicing a small area (Fig. 16). Within this territory they supply goods purchased in small quantities by food stores at lower cost and more quickly than larger competitors operating from more distant bases, but are not able to supply non-perishable goods as effectively. Formerly Dover had a general wholesale grocery which was forced out of business

¹Information pertaining to individual establishments supplied by members of the respective managerial staffs.

²U.S. Bureau of the Census. Fifteenth Census of the United States: 1930. Wholesale Trade (State Series) Ohio (Washington: Government Printing Office, 1932), p. 42.

by the competition of larger firms, chiefly from Canton.¹ Four agencies with seventeen workers distribute gasoline within a restricted area (Fig. 16). Within this they supply all of four brands of gasoline sold by retail distributors. Other brands of gasoline are sold in it and are supplied from other towns. The presence or absence of a distributor of a particular brand of gasoline appears to be a matter of chance in a larger distributional pattern. All of the establishments sell gasoline to individual bulk users and are bases from which hucksters retail gasoline. Two lumber yards sell to lumber dealers, contractors, factories, and coal mines within a limited area at special discounts. This service is incidental to other functions. Two horticultural establishments, with forty-two part time workers engaged mainly in production, supply cut flowers and mushrooms to dealers in a part of Ohio. Most of the output is sold in Canton, Massillon, and Akron. Some "Swiss" cheese is purchased at cheese plants and sold to retailers, jobbers, and manufacturers.

As a whole, the jobbing activities of Dover-New Philadelphia are of minor significance. The portion of the Pittsburgh-Cleveland region in which the Dover-New Philadelphia Area is located receives local jobbing services mainly from Canton and regional wholesale services from Pittsburgh and Cleveland. These large cities are too near to Dover-New Philadelphia to permit the development of major wholesale or jobbing functions in an urban center of such small size.

Governmental and Social Functions

The Dover-New Philadelphia Area performs important governmental and social functions for external territory, but most of these activities are primarily local in character. The ordinary police, fire protection, street maintenance, water supply, sewage disposal, and municipal governmental functions of cities are provided for the incorporated areas of Dover and New Philadelphia. The city of Dover also operates a municipal steam plant making electrical energy which is distributed within the Dover city limits. This service should probably be extended to include all the urban parts of the area. In other respects, it appears that the economies of operating the government of small cities outweigh

¹Information from former salesman.

possible gains from uniting Dover and New Philadelphia. Some unincorporated parts of the urban unit and its peri-urban fringe are occupied with an intensity which apparently would justify an extension of the corporation limits to bring to these portions of the area the urban services.

The city schools serve the incorporated area, adjoining portions of the inner trade zone, and minor parts of the intermediate trade zone. Beyond the inner zone the cities, towns, and villages form nuclear population groupings which constitute base centers of a county system of centralized schools, administered from offices in the county court house. Pupils are taken to the nearest center of sufficient size to sustain either an elementary or secondary school. Elementary students are brought by bus to Dover-New Philadelphia from a narrow zone beyond the city limits. This has a general width of one mile and a maximum breadth of two and a half miles. High School students are brought to the cities from a similar zone having an average width of two miles and a maximum extent of seven miles. With the exception of high school students from the New Cumberland trade area, all students transported by bus to the public schools of Dover-New Philadelphia are residents of the inner trade zones (Fig. 13). Four parochial schools and a private business college serve a few students from beyond the inner trade zone, but the majority of those enrolled are residents of the inner zone.

Churches, lodges, and other social organizations serve the nearer residents of the inner trade zone to almost as full an extent as the inhabitants of the cities. They also serve some residents of other parts of the inner, intermediate, and outer zones. Churches and grange organizations of the inner and intermediate zones serve many residents of Dover-New Philadelphia. Many urban dwellers attend the meetings of the country social groups to which they belonged before moving to the cities. The adjacent rural umland supplied a considerable portion of the migrants to Dover-New Philadelphia and social and family connections form strong ties between the surrounding rural population and the urban dwellers. These bonds tend to create a feeling of communal unity that includes the cities; the remainder of the inner trade zone; the rural portions, the villages, and the towns of the intermediate zone; and, to a lesser extent, even much of the outer trade zone. Saturday night crowds in the Dover and New

Philadelphia shopping districts are a social, as well as an economic phenomenon. In summer, especially, these districts become the main congregational center for the residents of Dover-New Philadelphia Area and its umland. The attraction of meeting friends and relatives draws residents of the countryside and the urban core to the central shopping districts. This social situation is an important asset to Dover-New Philadelphia merchants. It attracts customers from the inner, intermediate, and outer zones who might otherwise shop at Canton or Massillon.

New Philadelphia is the administrative center of the county government and of various county services by state and national agencies. These services help to sustain the inhabitants of the Dover-New Philadelphia Area in three ways: (1) by furnishing direct public employment for sixty-eight persons; (2) by creating a local demand for legal, printing, and other services; and (3) by public business which draws to the area people who consequently use its other services.

Three public agencies serve territory outside Tuscarawas County. A unit of the state highway patrol, with headquarters in New Philadelphia, has six officers. Its territory extends northward twelve miles, eastward fifteen miles, southeastward thirty miles, southward twenty miles, southwestward thirty miles, and westward thirty miles. An engineering office and repair shops for servicing and construction equipment of the state highway department are located in the peri-urban zone of New Philadelphia. They have approximately forty employees and service Holmes, Tuscarawas, Columbiana, Carroll, Jefferson, Harrison, and Belmont Counties which comprise Division Eleven of the State Department of Highways. In New Philadelphia the headquarters of the Muskingum Watershed Conservancy District have a permanent personnel of twenty-one persons. The Conservancy District includes the entire watershed, an area of approximately 8,000 square miles, or one-fifth of Ohio.

The Sub-Regional and Local Service Prospect

The inner and intermediate trade zones constitute the most important part of the service area for every major type of Dover-New Philadelphia function except regional manufacturing. Although the subsequent success or failure of the area's regional manufacturing will be the largest determinant of its future, de-

velopments in the umland also will be important.

Present conditions indicate slight prospect for increased services to inhabitants of the outer trade zone. Both its inner and outer limits lie in territory dominantly served by other centers. Relict social connections, based upon past migrations, now constitute the major centripetal force drawing the inhabitants of the zone toward the Dover-New Philadelphia service center. These ties may be expected to become more tenuous. Only renewed migration to Dover-New Philadelphia from the surrounding countryside would significantly strengthen them. With critical unemployment and an uncertain manufactural prospect, such migration is improbable.

On the other hand, present conditions indicate that the inner zone may expand to include parts of the intermediate zone and that the Dover-New Philadelphia services to much of the remainder may be greatly enlarged. Retailing activity at Strasburg and at Sugar Creek has declined with increased use of the automobile. This is also true in the towns with less than 1,000 inhabitants. If this tendency should continue, especially at an accelerated rate, Dover-New Philadelphia will become an increasingly important service center for those parts of the zone served by Midvale, Sherrodsville, Delroy, Zoar, Zoarville, Strasburg, Dundee, Sugar Creek, Ragersville, and Stone Creek. These parts of the intermediate zone have a population estimated at 13,275.¹ This group is forty-four per cent as large as the population of the inner trade zone. If these people could be induced to use the service facilities of Dover-New Philadelphia with the same intensity as residents of the inner zone, the retail and serviential establishments of Dover-New Philadelphia would benefit greatly. The preference of the residents for trading where they know other shoppers is Dover-New Philadelphia's chief attraction. It competes for the trade with Massillon and Canton, which have superior shopping facilities. Massillon and Canton may acquire a considerable part of the trade released in the intermediate zone by the decline of internal shopping. Deliberate efforts by the merchants of Dover-New Philadelphia to increase the social contacts between inhabitants of the inner and intermediate trade

¹ Estimate based on 1930 census data by minor civil divisions.

zones would probably be the most effective means to accelerate the tendency for inhabitants of the intermediate zone to enter the service orbits of Dover-New Philadelphia.

Changes in the economic structure of the umland are likely to greatly affect the purchasing power of its residents and, thereby, influence the sub-regional and local service prospects of Dover-New Philadelphia. Rural retrogression induced by destructive land use is apparent in the hill zones.

In York Township of Tuscarawas County,¹ one of the less rugged parts of the southwestern hill zone, with many inhabitants of Swiss extraction, 67.72 per cent of the farm land is included in dairy farms. Many dairy farmers have difficulty in producing as large crops as formerly to feed their herds. The carrying capacity of the pastures is declining. Partial crop failures along the draws on hillside fields, the whitish green of inferior pastures dominated by poverty grass, gullies in fields and pastures, and fresh detritus on the valley floors are widespread evidences of soil erosion. General farms, yielding an annual income of less than five hundred dollars, as compared with representative incomes on dairy farms in excess of fifteen hundred dollars, occupy 18.90 per cent of the farm land. Partly used farm buildings, designed for housing dairy herds and storing their food, are common proof that these farms formerly sustained the more profitable dairying. Abandoned farms make up 3.87 per cent of the farm land of the township. Unless farm practices are widely modified to conserve the soil resources required to feed adequate dairy herds, the economy in York Township will retrogress from profitable dairying to low income, general farming followed by ultimate land abandonment.

In other parts of Tuscarawas County, evidences of declining agriculture are even more pronounced. In the northeastern hill zone, where few of the original settlers were of Swiss stock, general farming has been of greater importance than dairying. The smaller size and poor upkeep of buildings are evidences of smaller incomes. Part of the northwestern hill zone of Tuscarawas County has been included in 3,746,071 Ohio acres classed as major land use problem areas by the Land Use, Planning Section, Farm

¹Edward W. Jones, "York Township: A Study of a Rural Area in Eastern Ohio" (Unpublished Master's thesis, Department of Geography, Kent State University, 1940), p. 7 and p. 12.

Security Administration, United States Department of Agriculture.¹ These lands are described as "rough eroding lands having low productivity; making farming undesirable and uneconomical; better adapted to forests and other uses." Diminished agricultural utilization of such lands in both hill zones will probably result from continued abandonment of farms. It may follow public purchase, as a part of programs designed to shift submarginal crop land into wiser land use as forests and parks or to abate the silting of reservoirs of the Muskingum Watershed Conservancy District. As a whole, these prospective changes in rural land use indicate material decline in the Dover-New Philadelphia services to the farm population. These unfavorable agricultural prospects in Tuscarawas County may be offset by conservational farm practices. Efforts are being made by various governmental agencies to induce farmers to employ cropping techniques which will preserve the soil resources. If wise farming replaces destructive practices, the agricultural productivity of these lands might be sustained or even augmented. Slopes between five and twenty per cent may be safely tilled on the Muskingum soils series of Ohio with conservational practices, but suffer excessive sheet erosion unless protected.² So much of the land in the hill zones has slopes of less than twenty per cent (Fig. 3), that the present cropped area could probably be maintained upon them. The agricultural outlook in Tuscarawas County will depend most largely upon the success or failure of efforts to secure effective soil conservation. Dairy farming may spread to some general farms and bring higher incomes. If the urban milkshed of northeastern Ohio expands to include the Dover-New Philadelphia umland, the farmers are apt to secure higher milk prices and larger incomes than at present. However, these favorable conditions cannot be realized unless soils are conserved. Declining farm incomes and population are more probable than increases.

The economic outlook for the village, town, and city population of the Dover-New Philadelphia umland is not encouraging. The manufacture of fire brick, paving brick, construction brick, sewer pipe, and tile and the mining of coal are of major significance in supporting the inhabitants. Only part of the ceramic

¹J.H. Sitterly and J.I. Falcomer, op. cit., Fig. 62, p. 92.

²Ibid., p. 89.

plant capacity has been utilized in recent years. Fluctuations in construction and heavy industrial production create recurring periods of vigorous and slight demand. Full employment in one plant and no work in a neighboring one have been characteristic phenomena. Recent technological advances have accelerated output more rapidly than increases in market demand. Tuscarawas County seems to have an excess of plants and laboring forces. Under these circumstances, the economic outlook for the ceramic workers of Tuscarawas County is not favorable.

The absolute and relative coal production of Tuscarawas County is declining (Table 22). In 1920 the county produced 2,231,345 tons and in 1938 only 669,651 tons. In twenty-one of twenty-three years between 1888 and 1909 Tuscarawas County contributed more than five per cent of Ohio's coal output, but in the twenty-nine years since 1910 there have been only seven years in which the county's share of the state total has reached five per cent. The slight mechanization and small size of mines in Tuscarawas County are probably factors in the decline (Tables 23 and 24 and Fig. 17). Inferior coal veins, generally less than four feet thick and dissected by closely spaced valleys,¹ have discouraged mechanization and the development of large mines. Tuscarawas County mines have been unable to use technological advances as fully as mines with better resources and labor cost has not decreased as rapidly. Union labor standards do not consider these factors and as a result larger union mines have been unable to operate profitably. Since 1938 four of the largest and best equipped mines have suspended operations. There has been an increase of small pick mines run by several workers on a partnership basis. The earnings are low and many of these mines were developed as a temporary expedient by miners formerly employed in the larger mines. Of the 1938 coal production in Tuscarawas County, only 19.3 per cent was shipped to market by rail; 1.4 per cent was used in the mines; 18.3 per cent used in factories operated in conjunction with the mines; and 33.3 per cent trucked to markets ten or more miles from the mine.² There is slight prospect

¹J.S. Bownocker and Ethel S. Dean, Analyses of the Coals of Ohio, Geological Survey of Ohio, Fourth Series, Bulletin 34, (Columbus: 1929), Map opposite p. 11 and pp. 81-89.

²Department of Industrial Relations, Division of Labor Statistics, State of Ohio, Statistics of Ohio Coal Mines and Quarries for the Year Ending December 31, 1938 (Columbus: 1939), Table 8.

of increased mining activity in Tuscarawas County or of augmented miners' incomes.

TABLE 22
RELATIVE AND ABSOLUTE COAL PRODUCTION OF
TUSCARAWAS COUNTY^a 1883-1938

Year	Tuscarawas County	Ohio	Per Cent of State Produc- tion from Tuscarawas County
1883	394,066	8,902,729	4.43
1884	317,141	7,650,062	4.15
1885	285,545	7,796,179	3.66
1886	267,666	8,395,213	3.18
1887	506,466	10,189,396	4.86
1888	546,117	10,911,016	5.01
1889	643,866	10,906,385	5.80
1890	565,105	11,791,862	4.79
1891	733,374	13,049,587	5.61
1892	887,106	14,599,308	6.07
1893	794,681	14,818,097	5.36
1894	651,903	11,910,219	5.50
1895	753,286	13,683,879	5.51
1896	613,563	12,912,618	4.75
1897	730,473	12,448,822	5.89
1898	950,913	14,058,135	6.76
1899	1,053,938	15,909,621	6.32
1900	1,267,185	19,426,649	6.52
1901	1,324,570	20,321,290	6.52
1902	1,577,654	23,929,287	6.58
1903	1,328,951	24,573,266	5.41
1904	1,296,876	24,583,715	5.28
1905	1,361,394	25,825,427	5.27
1906	1,429,565	27,207,486	5.20
1907	1,776,566	32,365,949	5.47
1908	1,331,248	26,287,800	5.06
1909	1,513,900	27,754,832	5.45
1910	811,782	34,424,951	2.36
1911	670,251	30,342,039	2.25
1912	1,311,301	34,444,291	3.82
1913	1,387,026	36,285,468	3.83
1914	906,459	18,716,407	4.84
1915	1,400,163	22,627,046	6.18
1916	1,547,110	34,526,522	4.48
1917	1,788,800	41,677,986	4.28
1918	2,120,837	47,919,202	4.44
1919	1,595,620	35,225,908	4.52
1920	2,231,345	45,227,062	4.93
1921	1,207,139	32,242,862	3.75
1922	1,388,546	27,526,555	5.04
1923	1,345,540	40,103,225	3.36
1924	1,073,558	30,117,093	3.56
1925	1,084,320	27,564,260	3.94

TABLE 22-Continued

Year	Tuscarawas County	Ohio	Per Cent of State Production from Tuscarawas County
1926	1,153,600	28,039,107	4.13
1927	996,621	15,762,367	6.34
1928	961,740	15,067,020	6.38
1929	1,002,074	23,128,649	4.33
1930	675,093	22,035,674	3.61
1931	703,245	20,422,980	3.44
1932	768,369	13,924,414	5.51
1933	965,990	19,615,564	4.92
1934	898,244	20,340,974	4.41
1935	1,145,265	21,076,226	5.46
1936	1,219,548	23,462,032	5.18
1937	1,195,264	24,509,192	4.88
1938	669,651	18,302,626	3.65

^aJ.A. Bownocker and Ethel S. Dean, op. cit.

Data for period since 1927 from Albert Azolino, Chief Division of Labor Statistics, State of Ohio.

TABLE 23

MECHANIZATION OF COAL MINES IN OHIO
AND TUSCARAWAS COUNTY, 1938^a

Method of Mining	Tuscarawas County			State of Ohio		
	Production	Per Cent of County Total of 669,651 Tons	Average Tonnage Per Machine Day	Production	Per Cent of State Total of 18,302,626 Tons	Average Tonnage Per Machine Day
Stripping with Power Shovels	45,446	6.8	21.2	2,337,988	12.8	105.3
Stripping Without Power Shovels	59,038	8.8	...	61,402	0.3	...
Machine Mined Under-Ground	474,413	70.8	49.0	15,329,088	83.8	94.7
Pick Mined	90,754	13.6	...	574,148	3.1	...

^aDepartment of Industrial Relations, Division of Labor Statistics, State of Ohio, op. cit., Tables 3-13.

TABLE 24

SIZE OF COAL MINES IN OHIO AND TUSCARAWAS COUNTY, 1938^a

Size of Mine	Tuscarawas County			State of Ohio		
	Production	Number of Mines	Per Cent of County Production	Production	Number of Mines	Per Cent of State Production
Over 200,000 Tons	0	0	0	11,169,841	24	61.1
100,000-200,000	110,829	1	16.6	2,335,599	17	12.8
50,000-100,000	55,002	1	8.2	1,512,330	20	8.3
10,000-50,000	265,720	12	39.7	1,783,310	78	9.7
5,000-10,000	85,751	12	12.8	518,726	76	2.8
Less than 5,000 tons	152,349	147	22.7	982,820	948	5.3

^aDepartment of Industrial Relations, Division of Labor Statistics, State of Ohio, op. cit., Table 10.

CHAPTER IV

CONCLUSIONS

The pattern of the Dover-New Philadelphia Area is more complex than might be anticipated from its site and situation (Figs. 1, 4, and 7). The junction of the narrow Upper Tuscarawas Valley and the broad Sugar Creek-Tuscarawas Valley is the natural focus of the locality (Fig. 3). The Dover Upper Terrace, which overlooks it, affords a satisfactory urban site (Fig. 5). Under these circumstances, a simple, harmonious pattern, centered on the Dover Upper Terrace, might be expected instead of the four distinct urban sections which are separated from one another by the river or by non-urban land (Fig. 4).

Each section is an accretion about a nucleus formed long ago (Fig. 6). Northern New Philadelphia evolved from a pioneer village which was established on the southern end of the New Philadelphia Upper Terrace in proximity to the terminus of the overland route from western Pennsylvania to the Sugar Creek-Tuscarawas Valley (cf. pp. 11-12). Northern Dover and Lockport developed from canal villages which were founded in situations that were made favorable when the Ohio Canal became the principal traffic artery of the area and its umland (Cf. pp. 14-16). Trans-riverine expansion from Northern Dover, in the Stage of Early Industrialism and the Stage of Expanding Metallurgical Activity, formed the nuclear core of Southern Dover (Cf. pp. 41-42). As urban developments occurred in the area, land in peripheral contact with previously used parts was preferred to outlying pieces. The four urban sections have grown in size. Residual non-urbanized tracts remain between them. The four sections, acting as nuclei of centrifugal and centripetal forces, have been important factors in the development of: (1) discrete street orientations in the older parts of the section (Cf. p. 16 and p. 22), (2) many newer streets which are continuations of the older parts of the patterns within the sections (Cf. p. 16 and pp. 22-23), (3) the peripheral location of manufactural establishments in the sections (Cf. p. 38), and (4) two coordinate central districts.

The beginnings of the central districts were established in villages more than two miles apart. Similar population growth, tributary to each, has helped maintain an equilibrium in their facilities and centripetal attractions (Cf. p. 32). Proximity and superior services, based on a larger population, enabled the New Philadelphia Central District to absorb the central functions from the smaller Lockport section (Cf. p. 19 and p. 20). The inhabitants of Southern Dover have always used the facilities of the Dover Central District (Cf. p. 32 and pp. 41-42).

The centripetal forces of the two central districts have helped to maintain separate communal feelings, social organizations, and municipal governments in Dover and in New Philadelphia (Cf. p. 25). They also divide the inhabitants of the umland into groups which habitually do the greater part of their shopping in different cores (Cf. p. 45). Each central district contains a focus of street and highway traffic (Cf. pp. 44-45). The characteristics of large city central districts are largely lacking (Cf. p. 25-32). The need of outlying commercial and communal establishments has been lessened (Cf. p. 37). The division of facilities in the Dover-New Philadelphia area restricts the power of its establishments to draw patronage from the umland to local and sub-regional manufactural shops (Cf. 71-72), to retail and allied service establishments (Cf. pp. 79-82), and to jobbing houses (Cf. p. 83). It reduces the extent of many service areas and is a factor in the localization of the limits of the inner, intermediate, and outer trade zones (Cf. pp. 79-82).

Coalescence of the pattern has occurred in spite of the centripetal forces of the four sectional nuclei and the two central district ones. Expansion based on population growth led to a gradual occupation of the interspaces between the sections (Fig. 6). This trend was accelerated by the presence of a railroad focus. Many manufactural establishments are grouped along arms of the railroads converging on the Dover Lower Terrace. Convenience of residence near places of work sustains centripetal forces that draw residential occupation toward these factories. The several forces unite in a resultant of forces drawing new developments toward the railroad hub. This pull affects all sections and has helped, especially, to bring Northern New Philadelphia and Southern Dover together (Cf. p. 22).

The decreased manufactural employment (Cf. pp. 9-10),

and the generally unfavorable manufactural prospect (Cf. pp. 65-68), indicate that the forces which have induced coalescence are not likely to overcome the strong centripetal forces of the four urban sections and of the two commercial cores, in the immediate future.

Like its pattern, the manufactural character of the Dover-New Philadelphia Area is largely a heritage. Regional manufacturing is the most important support of the inhabitants (Cf. p. 7 and pp. 46). Geographic inertia is a major factor in the presence of regional manufactural establishments. Industrial successions, inaugurated in a blast furnace using local ore, flux, and fuel, were factors in the localization of six establishments that employ 70.3 per cent of the workers (Cf. p. 60). Successions, initially based on the use of other local raw materials, affected the localization of three establishments which employ 4.7 per cent of the workers (Cf. p. 62). Free buildings, low cost facilities, and structures purchased to eliminate competition, were factors in the localization of five establishments with 23.4 per cent of the workers. Directly or indirectly, these buildings were available as results of the preceding industrial successions (Cf. p. 64).

The character of the regional manufactural establishments is adjusted to the advantages of the area's situation. However, significant succession may have been in the localization of plants, the advantages of the area's situation are more important. They were factors in localization and in subsequent successful operation. This area is a part of the Pittsburgh-Cleveland region. Eighty-six per cent of the workers are employed in factories which use materials originating in its metallic industries (Table 6). The wages in the area are below those in larger nearby cities (Cf. p. 47). Labor costs form over 30 per cent of the total value of products in establishments which employ 81.5 per cent of the workers (Table 7). Local coal costs form over five per cent of the value of products in establishments with 76.4 per cent of the workers (Table 7). The area is centrally located within the densely peopled American Manufactural Belt, an advantage in marketing consumer goods. These goods, sold chiefly in this belt, are produced in establishments with 71.2 per cent of the workers (Table 12).

Although these favorable conditions have aided in the

localization and permit the successful operation of the Dover-New Philadelphia establishments, they are shared by so many competitive centers that they do not assure the continued presence of the establishments in the area.

The depressed condition of the Dover-New Philadelphia Area is largely a result of the loss of manufactural employment that followed external developments, which removed the advantages the area formerly possessed for primary iron and steel production (Cf. pp. 39-40). The industrial structure developed in the Stage of Expanding Metallurgical Activity supported a population greater than can be sustained adequately by the present industries.

The advantages of the area permit, but do not assure, the localization of new industries or the expansion of old ones. The need to secure added manufactural employment warrants greater efforts to attract factories than have been made. The brewery and the animal fats refinery were attracted to the area, during the depression period, partly by old buildings which were available at low cost. Collective purchase of idle manufacturing plants, to be offered free, or at very low cost, to prospective industries, seems eminently desirable. If adequate employment is provided, the social and economic consequences which would follow a continuance of the present unemployment will be avoided.

The limits of the service areas of local and sub-regional establishments of the Dover-New Philadelphia Area form eccentric and complex patterns (Figs. 12, 14, and 16). The size and spacing of urban centers and the characteristics of the services affect the location of these limits (Cf. pp. 71-72, pp. 72-74, p. 83 and Fig. 13). The division of trade facilities in the Dover-New Philadelphia Area limits its centripetal trade attraction to that of two small independent cities. The trading habits of the inhabitants of the area and its unland differentiate three trading zones (Fig. 15). The average inhabitant in the inner zone appears to contribute as much business to Dover-New Philadelphia merchants as four such residents in the intermediate zone or twenty occupants of the outer zone (Cf. pp. 78-79). Population groupings with 1,000 or more inhabitants spaced at distances of more than three miles and less than thirteen miles from Dover-New Philadelphia reduce the total trade of its merchants. Within these distances smaller population groupings increase their trade (Cf. p. 81).

The services to the umland are performed mainly by establishments developed primarily to serve the urban parts of the area (Table 17). Their future prosperity will depend chiefly upon the manufactural evolution within it. In a region of vigorous competition between closely spaced urban units, there is some hope, but no great prospect, for increased support from the umland (Cf. pp. 80-87). In the locality, the destruction of soil resources, unfavorable trends in the ceramic industries, and declining coal production are adversely affecting business in the Dover-New Philadelphia Area (Cf. pp. 87-90).

The uncertain future and the social problems, inherent in the depressed condition of the Dover-New Philadelphia Area, are largely a heritage for which the present inhabitants are not greatly responsible. To a major degree, they are unlikely to solve these problems satisfactorily. Their needs, like those of the dwellers in many other depressed areas, require governmental assistance to attain more effective utilization of the human, cultural, and natural resources.

APPENDIX

NOTES ON THE FIGURES

Figure 1. The Extent of the Dover-New Philadelphia Area

Base Map: County Surveyor Tuscarawas County, Ohio, Map of Tuscarawas County, 1936. Scale 1:31,250. Field Data collected in 1936. Field observations were carried toward Parral, Midvale, and Goshen until three-fourths or more of the residences were occupied by workers in these centers. Elsewhere the observations extended outward from Dover-New Philadelphia until in a mile of road frontage there were no residents working in Dover-New Philadelphia. Although some workers come to Dover-New Philadelphia from beyond these limits, they form a very slight part of the Dover-New Philadelphia working force and their residences are not seemingly important in the outlying occupance pattern. Within the area of field observation, all property used as a functional part of the Dover-New Philadelphia urban unit was mapped as a part of the Dover-New Philadelphia Area.

Figure 2. The Regional Situation of the Dover-New Philadelphia Area

Base Map: United States Geological Survey, Topographical Maps of the United States, Navarre, Dover, Newcomerstown, and Uhrichsville, Ohio, quadrangles. Scale 1:62,500. Base revised, in accord with information by the county surveyor and engineers of the Muskingum Watershed Conservancy District, to show location of roads, railroads, and reservoir sites.

Figure 4. Land Utilization Dover-New Philadelphia Area

Urban Base: City Engineer Dover, Ohio, and New Philadelphia, Ohio. Map of the Cities of Dover and New Philadelphia in Tuscarawas County, Ohio, 1932. Scale 1:24,000. Peri-urban base: same as Figure 1. Field data collected 1936. Revised 1939.

Figure 5. Site of Dover-New Philadelphia Area

Base: Same as City Base Figure 4. Land forms delimited in field, 1936.

Figure 6. The Sequential Fixation of Pattern, Dover-New Philadelphia Area

Base: Same as Figure 4. Data from Court House Records and county histories.

Figure 7. Urban Districts of Dover-New Philadelphia

Base: Same as Figure 4. Field data collected in 1936.

Figure 8. Dover Commercial Core Utilization of Ground Floor

Base: Blue Print Map supplied by City Engineer. Scale 1:4,000. Field data collected in 1936.

Figure 9. Dover Commercial Core Utilization of Upper Floors

Base: Same as Figure 8. Field data collected in 1936.

Figure 10. New Philadelphia Commercial Core
Utilization of Ground Floor

Base: Same as Figure 8. Field data collected in 1936.

Figure 11. New Philadelphia Commercial Core
Utilization of Upper Floors

Base: Same as Figure 8. Field data collected in 1936.

Figure 12. Selected Service Areas of Local and Sub-Regional Man-
ufactural Establishments of the Dover-New Philadelphia Area

Base: Bureau of Census, Ohio Minor Civil Divisions, 1930.
Scale 1:500,000. United States Government Printing Office, 1934.
Limits drawn by managers of the manufactural establishments in
1936.

Figure 13. Villages, Towns, and Cities in or Near
the Dover-New Philadelphia Trade Territory

Base: Same as that for Figure 12. Population, accord-
ing to census of 1929. Trade limits taken from Figure 15.

Figure 14. Selected Service Areas of Retail and Servi-
ential Units of the Dover-New Philadelphia Area

Base: Same as that for Figure 12. Limits drawn in 1936
by the managers of the respective types of establishments. Some
executives, especially those of establishments with limits ex-
tending to or beyond the county boundary, expressed the feeling
that the limits they had recorded were not very accurate. It
appears that they did not know the precise location because the
information was not particularly important to them. Many limits
lie in poor agricultural districts with relatively sparse popu-
lation and most of the limits of the more extensive service
areas lie far out in territory from which these Dover-New Phila-
delphia establishments draw a minor part of the trade. On the
map, coincidence of parts of the food, hardware, and bank service
limits and the county boundary is very likely no more than an
expression of the fact that actual trade limits lie close to the
county line and that their precise location is of slight signi-
ficance. Although the limits marked by the merchants probably
contain many errors, they show with considerable accuracy the
location of the more important boundaries and are a useful tool
in interpreting the geography of the area and its umland.

Figure 15. Trading Zones and Trading Areas Served
by Dover-New Philadelphia

Base: Same as that for Figure 12. The limits of the
twenty-two trading areas are composites of the knowledge of many
residents of the umland concerning the extent to which their
neighbors depend upon the facilities of Dover-New Philadelphia.
For each area, one resident or more described the general trad-
ing habits in his locality and afterwards drew upon a large base
boundaries including the area in which the trading habits were
similar. Every part of each of the boundaries on the twenty-two
preliminary maps is within one-eighth mile of coincidence with
the limit indicated in Figure 13. The agreement is indicative
of the accurate knowledge of the persons making the preliminary
maps. The final map shows differences in the extent of depen-

dence upon the facilities of Dover-New Philadelphia and those of other centers in a manner which proved very helpful in interpreting the significance of trade with various parts of the umland.

Figure 16. Service Areas of Wholesale Establishments
of the Dover-New Philadelphia Area

Base: Same as that for Figure 12. Information supplied by wholesale executives in 1936.

Figure 17. Coal Mines of Tuscarawas County

Base: County Surveyor, Tuscarawas County, Map of Tuscarawas County, New Philadelphia, 1936. Information gathered in 1932 by William McIntosh for the Coal Operators Association.

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DOVER-NEW PHILADELPHIA AREA

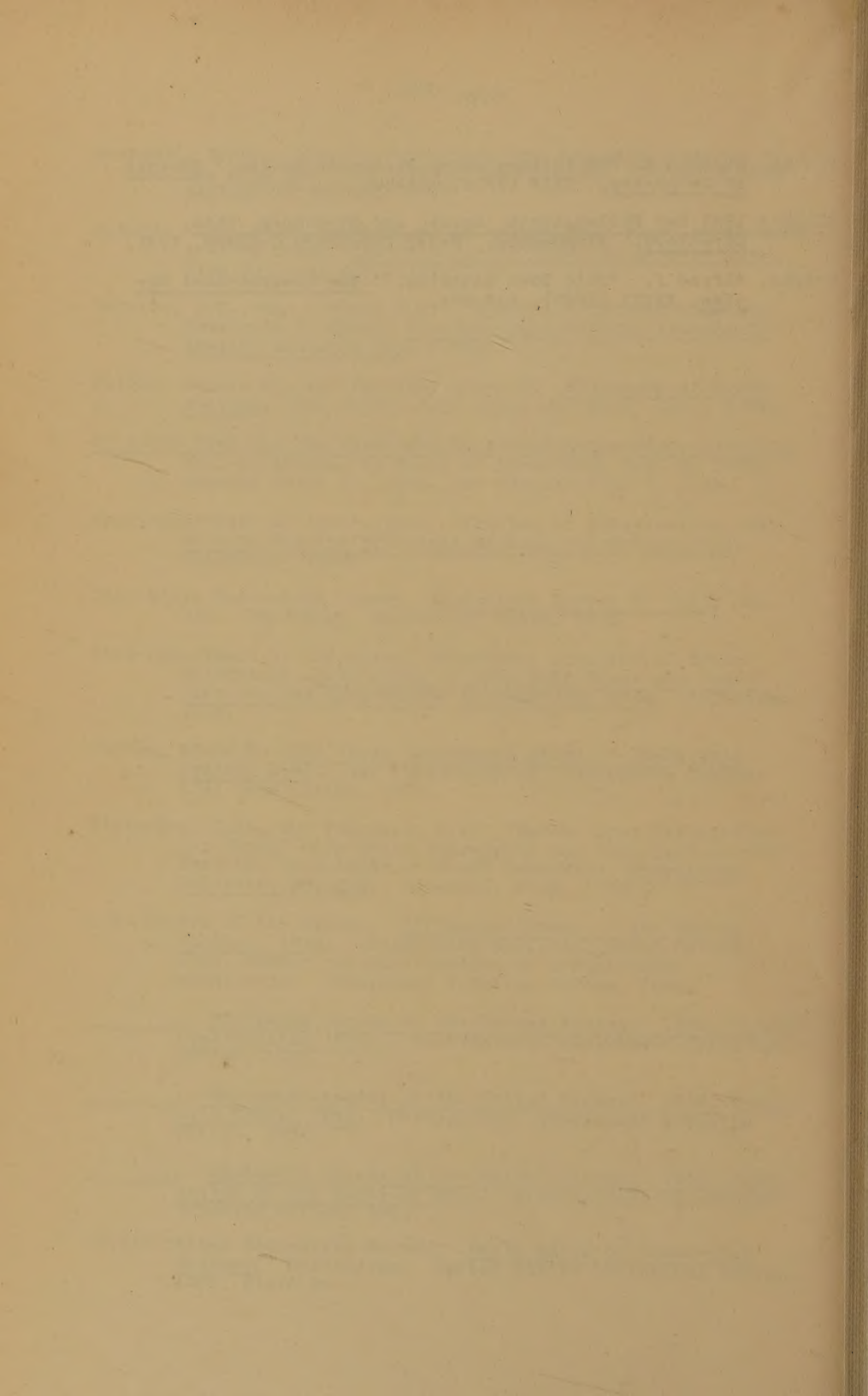
Maps and Plates in the Pocket

Figure

1. Extent
2. Regional Situation
3. Local Situation
4. Land Utilization
5. Site
6. Sequential Fixation of Pattern
7. Urban Districts
8. Dover Commercial Core--Ground Floor
9. Dover Commercial Core--Upper Floors
10. New Philadelphia Commercial Core--Ground Floor
11. New Philadelphia Commercial Core--Upper Floors
12. Service Areas of Local and Sub-Regional
Manufactural Establishments
13. Villages, Towns, and Cities in or near the
Dover-New Philadelphia Trade Territory
14. Service Areas of Retail and Servential Units
15. Trading Zones and Trading Areas Served by
the Dover-New Philadelphia Area
16. Service Areas of Wholesale Establishments
17. Coal Mines of Tuscarawas County

Plates

- I. Landscapes in the Area and in its Umland
- II. Part of New Philadelphia from the Air
Looking Northward
- III. Part of Dover Looking Downward from 10,000 Feet
- IV. Views in the Central Shopping Districts
- V. Residences
- VI. Manufactural Landscapes



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